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LIGHT RAILWAYS (INVESTIGATION) COMMITTEE.

APPENDICES

TO

REPORT

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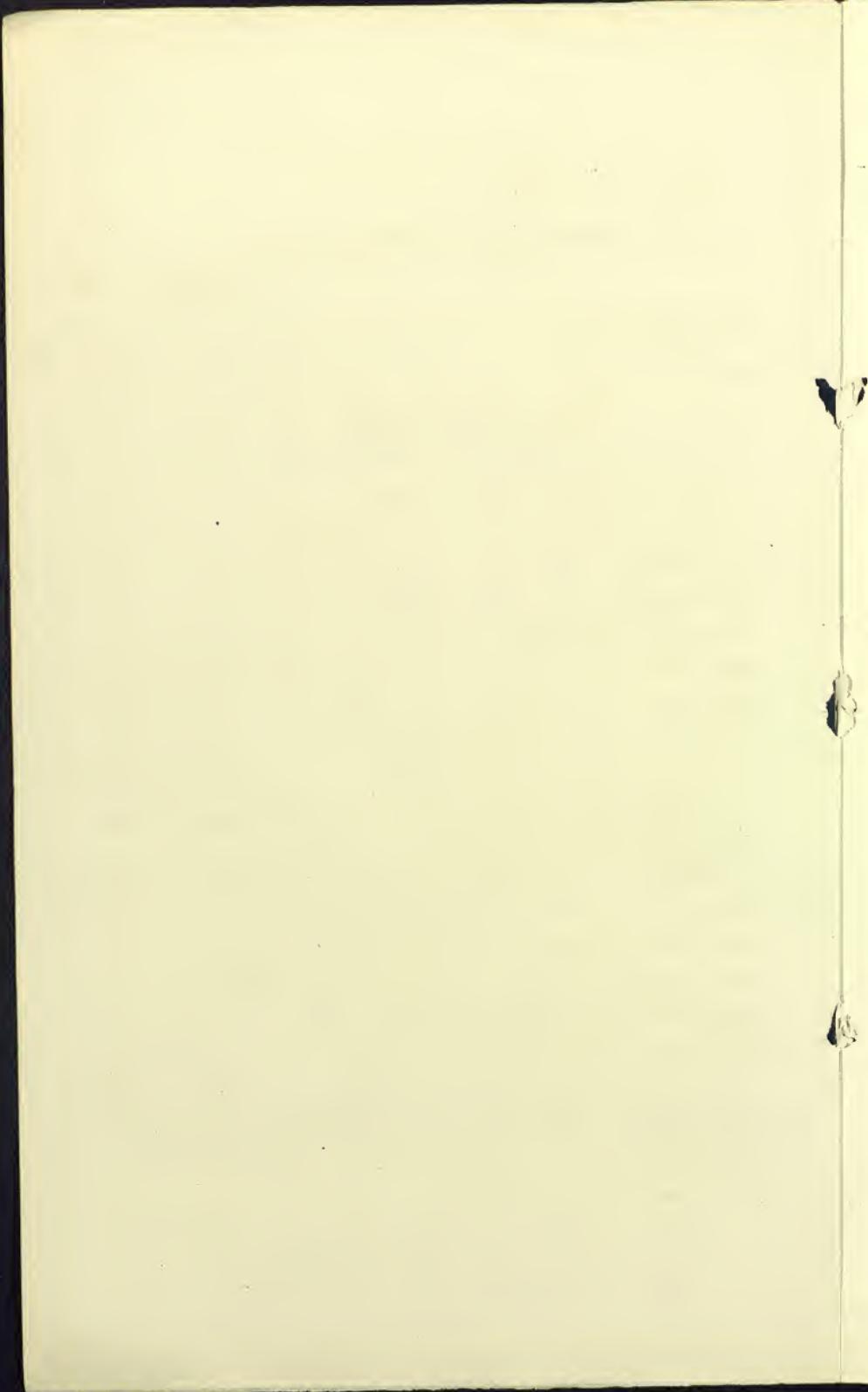
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APPENDIX A.

Light Railways in the United Kingdom.

History of Past Development and Legislation.

(1) When viewed in relation to the high degree of development attained by the principal railway systems in the British Isles, and in comparison also with the extensive and systematic growth of light railways in Belgium, France and other Continental countries, the results achieved by light railway enterprise in the United Kingdom have, owing to a variety of causes been small and disappointing.

(2) The Light Railway Commissioners, having regard to their experience in connection with the promotion of light railways in rural areas in Great Britain, have repeatedly dwelt in their annual Reports upon the necessity for a co-ordinated system and an organised provision (under the same control and authority) of the means of transport both by road and rail. In their opinion one of the chief reasons why light railways have not been constructed in many rural districts is that the character of the cultivation is not such as to yield sufficient produce to afford a paying traffic or to support upon the land a population sufficient to provide a remunerative passenger and general traffic. They are of opinion, however, that in Great Britain there are many and large rural areas which are capable of, and should attain, a state of development in which light railways would form an important factor in any system of local transport organised on an economical basis.

In this connection the following extract from the Commissioners' Report of their proceedings up to the 31st December, 1920, is of particular interest:-

"Generally speaking the soil will be found a predominant factor in such agricultural districts only as admit of and obtain a thorough arable cultivation producing both corn and the heavy root crops (including potatoes); we may add that in most districts in Great Britain such a standard of production however essential is far off and must take some years to arrive at, depending as it ultimately does upon stable and remunerative prices for agricultural produce, and calling for an increase in the resident working population and a sufficient supply of further capital and credit.

In most of the districts traversed by the proposed light railways schemes above referred to, the systems of cultivation now obtaining there would not be likely to bring a self-supporting traffic, having regard to the present almost prohibitive costs of railway construction and working; in some cases however adequate transport facilities may be a condition precedent to a more thorough development, and in other cases (of which the "Fens" scheme is a good example), where the land is fertile and would be fully cultivated if the capital for construction (of the cheapest type consistent with practical efficiency) could be found and if the rates authorised were adjusted to the cost of the service, and if the line were economically worked, there would be sufficient traffic to give an adequate return on the capital".

The Commissioners add at the same time that their experience demonstrates the difficulty of obtaining adequate financial contributions for transport schemes - however valuable - from those persons who have also to find the capital required for the cultivation of the land, inasmuch as their resources and credit are generally limited and are fully taxed for this specific purpose. This financial aspect of the problem is more fully referred to in paragraphs 20 to 26 of this Memorandum.

(3) It will be convenient, at the outset, to refer briefly to the various legislative enactments bearing upon the construction of light railways. The Railway Construction Facilities Act, 1864, was designed "to facilitate in certain cases the obtaining of Powers for the Construction of Railways" including the construction of branches or other new works in connection with existing lines; and under this Act the authority for the construction of a Railway might be obtained in the form of a certificate settled by the Board of Trade and subject to approval by both Houses of Parliament. Such a certificate, however, could be obtained only in those cases in which the landowners and others beneficially interested consented to the construction of the railway: and it was expressly laid down in the Act that those provisions of the Lands Clauses Acts and Railways Clauses Acts which conferred compulsory powers for the taking of land, etc. should not be incorporated in the certificate.

(4) The first actual use of the term "light railway" occurs in the Regulation of Railways Act, 1868, by which the Board of Trade was empowered to authorise a company "to construct and work or to work as a light railway" the whole or any part of a railway which the company had power to construct or work. Section 28 of the Act prescribed that on such a line the maximum axle weight should not in any case exceed 8 tons and that the speed of trains should not exceed 25 miles per hour: but, subject to these two limitations, the railway might be constructed and worked under such conditions and regulations as the Board of Trade might from time to time impose.

(5) Few light lines, however, were constructed under the provisions of the Acts of 1864, and 1868, owing partly to the difficulty of securing the consent of landowners and other interested parties & of avoiding the opposition of existing railway or canal companies and possibly also to the limitation of the axle load which would have prevented the circulation of main line engines over any light line constructed under the Act of 1868.

(6) Until the passing of the Light Railways Act, 1896, the law particularly affecting the construction of such railways in Great Britain was mainly contained in the Acts of 1864 & 1868 whilst tramways were dealt with in the Tramways Act of 1870.

(7) For lack of any better legal provision for the construction of light railways advantage was taken of the Act of 1870 by the promoters of certain lines which, though legally designated "tramways", partook to some extent of the character of light railways. Broadly speaking, however, this Act did little to meet the difficulties which the light Railways Act of 1896 was subsequently designed to overcome. The former clearly contemplated the construction of tramways of the type ordinarily found on the streets of city

and suburban areas. Under its provisions a confirming Act was necessary, even where no compulsory powers for the taking of land were sought by the promoters, and facilities for the carriage of goods could only be successfully provided with the assistance of railway companies or in cases where the tramway concerned was actually the property of such a company; the Act itself gave the tramways no power to secure the necessary facilities for transhipment, etc. Additional obstacles were occasionally placed by local authorities in the way of the construction of light railways under the Act, e.g. by reserving to themselves a right of pre-emption on terms which tended to discourage other promoters.

(8) So far as Great Britain was concerned, the legislative status quo remained unaltered till 1896. In the interim, the influences of foreign competition and other causes led to a serious depression in agricultural industry. It was realised that amongst the difficulties with which the British agriculturist had to contend the lack of direct means of transport between farm and market was not the least important, and the persistent efforts of those who had been impressed by the advantages of Light Railways on the Continent led eventually to the passage of the Light Railways Act of 1896. It is doubtful even now, however, whether the agricultural community itself has realised fully the advantages which could be derived from a wider use of the facilities which such railways offer, e.g. by the bulking of consignments in order to secure the benefit of lower rates.

(9) The main provisions of the Act 1896 are well known, but it may not be out of place to summarise here the various measures of relief which it was intended to afford. It applies to Great Britain alone and under its provisions it is no longer necessary to obtain a special Act for the construction of a light railway. Authority for the construction of a line may be obtained in an Order made by the Light Railway Commissioners and such an Order after confirmation by the Minister of Transport possesses the force of an Act of Parliament. The Minister, if he considers it expedient so to do, may submit the proposals of the promoters to Parliament, but this course has so far not been found necessary. Local authorities - the Council of any County, Borough or District - may be authorised to construct and work a light railway, and may make advances to light railway companies either by way of loan or as part of the share capital. They may also act jointly with other Councils or with individuals, corporations or companies both in making application for an Order and in carrying out the work of construction, etc. Land may be compulsorily acquired without recourse to Parliament, the provisions of the Lands Clauses Acts being applicable, except that the amount of compensation is determined under the Arbitration Act, 1889, and that a condition is introduced with regard to the betterment of adjoining lands.

(10) The Light Railway Commissioners state that, in practice, this provision with regard to betterment is without material effect and that in their opinion the acquisition of land for light railways should preferably be carried out under the procedure of the Acquisition of Land (Assessment of Compensation) Act, 1919; but, as it stands, this Act cannot be applied to purchases by undertakings "trading for profit". Subject to certain limitations and conditions, the Treasury may assist the promoters either by way of a loan at the normal rate of interest or by way of a "special advance" which may

Appendix A.

take the form either of a loan or of a free grant or may be partly a free grant and partly a loan.

A Light Railway Order may also authorise the construction of a line on public roads.

(11) With regard to the methods of construction and working the general enactments relating to public safety etc., may apply to a light railway, but only in so far as they are actually incorporated in or applied by a Schedule to the Order authorising the construction of the line. Light railways have therefore been treated more leniently than standard lines in respect of such matters as permanent way, gauge, fencing, road crossings, signalling, brake power, station requirements, etc.

(12) The Act of 1896 has been continued and amended by the Light Railways Act of 1912 which extends from £250,000 to £750,000 the limit of the amount available for the purposes of "special" advances to be made by the Treasury under Section 5 of the Act of 1896 and provides that applications for advances under the Development and Road Improvement Funds Act, 1909, shall be referred to the Light Railway Commissioners. The Act of 1912 also affords added facilities for the acquisition of property in cases where parts only of houses, etc., are required. The powers of the Development Commissioners to make advances are now merged in the general powers of the Ministry of Transport; they were not of practical use as advances thereunder were restricted to bodies not working for profit. In actual fact no such advances were made.

The Act of 1912 allows the Minister of Transport a wider discretion in fixing the amount of the expenditure which a Council may incur on the construction, etc., of a light railway wholly or partly outside its own area. It makes provision for the winding up of a light railway company which has ceased to be in a position to carry out the objects for which it was incorporated. Finally, it confers upon the Light Railway Commissioners the power, in certain cases, to act as arbitrators in matters which are stated in a Light Railway Order to be determinable by arbitration.

(13) As already indicated the Acts of 1896 and 1912 apply to Great Britain only.

In Ireland, the development of light railways has been more rapid, but this has only been rendered possible by the grant of liberal assistance from public funds. In the development of her railway system generally Ireland has relied upon such financial aid to a far greater extent than Great Britain. From the outset money was advanced to Irish Companies by the Treasury, usually on the security of mortgages on the undertakings and without the reservation of any corresponding right of control in matters of working, rates, etc.

(14) The railways in Ireland also received assistance from the Counties or Baronies in the form of guarantees of interest secured upon the rates - the authorities having no powers of control beyond the right of nominating a few members of each of the Boards of Directors concerned.

(15) In addition to assistance thus received from public sources the railways frequently received the private aid of landed proprietors, either in the form of subscriptions of Capital or in guarantees of interest.

(16) In the poorer districts, however, there was little to attract private capital and legislation was for a long time unfavourable to the construction of the light railways which were urgently required. The Tramways (Ireland) Act of 1860, it is true, made provision for the compulsory acquisition of land, but projects framed in accordance with that Act had first to be submitted to the Grand Jury and to the Lord-Lieutenant in Council and finally to Parliament for confirmation by Act. This last formality was, however, dispensed with by an amending Act in the following year. By the Tramways (Ireland) Amendment Act, 1871, mechanical traction on roadways was permitted up to a maximum speed of 6 miles per hour in country districts and 3 miles per hour in towns; and in 1881 the first of these maxima was raised from 6 to 12 miles per hour.

(17) More important, however, than any of these measures was the Tramways and Public Companies (Ireland) Act of 1883, which was followed by the Light Railways Act of 1889, the Railways (Ireland) Act and the Transfer of Railways (Ireland) Act, both of which were passed in 1890, the Tramways (Ireland) Act of 1895 and, finally, the Railways (Ireland) Act of 1896.

(18) A descriptive summary of the principal legislative enactments affecting light railways in Ireland, together with a valuable statement of the effects of the statutes in question is contained in Part II of the Final Report of the Vice-Regal Commission on Irish Railways (Cd.5247 - 1910) and in the Tables appended thereto. As that Report contains a more or less detailed statement of the circumstances which led up to the legislation in question, of the Acts themselves, of their working and of the light railway development which took place under these enactments up to the year 1910, it is unnecessary here to do more than to refer to the Commissioner's Report and to add that during the past ten years the process of development has been arrested and that the financial position and prospects of existing light railways in Ireland have not improved. On the contrary the position of these lines, e.g. with regard to maintenance and finance, is becoming steadily more serious.

(19) In the absence of any clear and concise definition of the term "light railway" no rigid line of demarcation can be drawn between light and heavy railways on the one side and between light railways and tramways on the other. The mileage of so called light railways of the United Kingdom - excluding lines having the character of "tramways" - may, however, be summarised approximately as follows:-

Appendix A.

| Country. | Marrow Gauge Lines, includ- ing a few Glass A° lines. | Standard Gauge lines Glass A°. | Other Standard Gauge Lines. | Totals. |
|---|---|--------------------------------------|-----------------------------|---------|
| | Miles | Miles | Miles | Miles. |
| England (including Jersey & Isle of Man) | 182.90 | 312.375 | 97.375 | 592.65* |
| Scotland. | 12.73 | 87.750 | - | 100.48* |
| Wales. | 84.45 | 63.750 | 15.250 | 166.45* |
| Ireland. | 568.56 | - | 84.750 | 653.31 |
| Totals. | 851.64 | 463.875 | 197.375 | 1512.89 |

o In the classification adopted by the Light Railway Commissioners' Class "A" includes lines laid entirely upon acquired lands, and on most of these steam motive power is employed.

* Some of these lines, through absorption, have lost their individuality, except as Lines of Local Interest which might require "remaining".

(20) With regard to the development which has taken place in Great Britain under the operation of the Acts of 1896 and 1912, the twenty-second and twenty-third annual Reports of the Light Railway Commissioners clearly indicate that the enactments in question have not been markedly effective in promoting new construction.

(21) In a summary of the results achieved during the period from the passing of the Act of 1896 up to the 31st December 1918, the Commissioners stated that 687 applications for Orders authorising light railways (including 124 applications for amending Orders) had been received. The total mileage of the lines proposed was 5051 miles and, so far as the Commissioners were concerned, applications had been granted in respect of 2272 miles whilst the Orders confirmed authorised the construction of 2101 miles. Of these, however, only about 900 miles had actually been constructed, of which about 550 miles were on land acquired and the remainder on roads. This remainder includes lines which, though legally classed as "light railways", are really "tramways". Such lines have purposely been excluded from the table in paragraph 19. About three-fifths of the mileage laid on lands acquired were either owned or worked by existing main line companies and included all mileage (80 miles) aided by free grant from the Treasury and also 22 miles aided by loans from the same source. In addition to the 22 miles worked by existing railway companies Treasury loans were also granted in respect of 23 miles of line on the hands of independent light railway companies.

(22) It was stated in the Commissioners' Report for the period ended on the 31st December 1919 that during the last year of the period 15 applications for Orders had been received, whilst 4 Orders had been submitted for confirmation and 7 Orders (authorising 20½ miles of line) had been confirmed during 1919. At the close of the year, 20 applications

remained to be dealt with, and concerning these the delay in progress was attributed to difficulties of finance.

(23) Of the total sum of £1,000,000 made available by statute for advances by the Treasury under the Acts of 1896 and 1912 only £203,000 had been advanced up to the 31st December 1918, (143,000 in free grants and about £60,000 in loans) whilst a further amount of £178,000 had been promised in respect of 71 other miles of line which had not, so far, been proceeded with. Thus, of the Treasury fund originally available, more than £600,000 was still unassigned at the close of the year 1918.

(24) The Commissioners pointed out also that the advances and promises in question had been made, for the most part, during the earlier years of the period covered by their Report and that, notwithstanding the large mileage of light railways which could not be proceeded with owing to lack of funds, responsible promoters had not been in a position to comply with the conditions under which advances were offered under the Light Railways Acts, nor in recent years either to seek or obtain special assistance from the State to any material extent.

(25) The Commissioners attributed this to the fact that under the said Acts only a proportion of the necessary capital might in each case be found by the State and that the requisite balance in the shape of private capital was seldom forthcoming; and they expressed the view that, except in cases where such capital was attracted by the prospect of some particular traffic or of the furtherance of some definite interest, the financial provision for light railways would have to be made out of public funds, national or local.

(26) In their Report for the period ended the 31st December 1919 the Commissioners again attributed the dearth of effective applications for advance from the Treasury to the fact that the statutory conditions governing the grant of such advances were not such as to meet the difficulties which promoters encountered in the effort to raise the necessary capital for their schemes; but it was anticipated that for future purposes the powers of the Treasury to make advances under the Light Railways Acts would be superseded by the "more practical powers and procedure" instituted under the Ministry of Transport Act, 1919, which enabled the Minister (with the approval of the Treasury) to make advances in aid of light railways on such terms as he might think fit in each case.

(27) It should be added that in the foregoing survey of the development of light railways in the United Kingdom no account has been taken of these lines which have been constructed for private (industrial) purposes and in respect of which no statutory authority has had to be obtained. Such lines are numerous, especially in the colliery and quarrying districts. They perform functions of great importance and, in the aggregate, their mileage is considerable; but, as they are privately owned and operated, exhaustive enquiry would be necessary in order to form even an approximate estimate of the extent to which the need for light railways has thus been met. It may safely be said, however, that an appreciable part of the demand has been met by this means and that the figures of mileage in respect of the statutory undertakings do not furnish a complete or accurate measure of the total results of light railway enterprise in the United Kingdom.

ACQUISITION OF LAND FOR LIGHT RAILWAYS - BETTERMENT.

(28) The Act of 1896 relating to Light Railways in Great Britain provides that, in cases where the arrangements for the acquisition of land are not settled by agreement, the procedure defined by the Lands Clauses Acts shall be followed. Where any variation of the provisions of the Clauses Acts is required the Ministry of Transport (as formerly the Board of Trade) must make a special report to Parliament; but no variation whatever is allowed of the provisions respecting the purchase and taking of land otherwise than by agreement.

(29) This provision in the Act of 1896 (Section II) was apparently intended to prevent the provisions of the Clauses Acts from being modified except in special circumstances. It has since been amended, in one detail, by the Light Railways Act of 1912 in which it is provided that in certain cases Section 92 of the Lands Clauses Consolidation Act, 1845, may be varied in a Light Railway Order in such a way as to allow of a part (instead of the whole) of a house, building or factory being taken.

(3) Section 13 of the Act of 1896 also provides for the appointment of a single arbitrator to settle the price to be paid for land and the compensation to be given for injury and for temporary occupation, and also to settle questions of apportionment of rent charges; and the same Section also provides that in determining the amount of compensation the arbitrator shall have regard to the extent to which the contiguous lands belonging to the same proprietor may be benefited by the proposed railway. Under Section 8 of the Act of 1912 the Light Railway Commissioners act as arbitrators if the parties make a joint application to them for this purpose; or, where under any Light Railway Order the Minister of Transport has power to appoint an arbitrator, he may with the consent of the parties appoint the Commissioners to act in that capacity. The question of betterment, however, is dealt with more fully below.

(31) It is widely recognised that the Lands Clauses Acts, by which the procedure for the compulsory purchases of land is mainly governed, and the practice which has developed under those Acts do not afford those facilities which present conditions demand. The question was considered by the Acquisition and Valuation of Land Committee, under the Chairmanship of Mr. Leslie Scott, K.C., M.P.. In their Second Report, issued in November 1919, they dealt particularly with the matter of Valuation and the cognate questions of Arbitration and Betterment. Their examination of the subject and their statement of the relative facts and arguments were so exhaustive that any attempt to traverse the same ground in this Memorandum would be out of place. The following Summary of Recommendations, extracted from the penultimate paragraph of their Second Report will serve to indicate the nature of some of the problems with which the Committee dealt and of the relative conclusions at which they arrived. It should be explained that in their First Report the Committee had proposed the setting up of a "Sanctioning Authority" consisting, in effect, of a Joint Sub-Committee of the two Houses of Parliament supplemented in personnel by men qualified by experience of affairs in various spheres of national life, and they recommend that, subject to certain exceptions in the case of Local Authorities, every application for power to acquire land compulsorily should be referred to the "Sanctioning Authority".

SUMMARY OF RECOMMENDATIONS.

- (1) The Lands Clauses Acts are now out of date, and should be repealed and replaced by a fresh code.
- (2) The standard of value to be paid to the owner should be the market value as between a willing buyer and a willing seller in addition to fair compensation for consequential injury.
- (3) No allowance for the compulsory acquisition of land should be added to the market value.
- (4) The owner should not be entitled to any increased value for his land, which can only arise, or could only have arisen, by reason of the suitability of the land for a purpose to which it could only be applied under statutory powers.
- (5) No enhancement of market value should be taken into account which arises from the use of the premises in question in a manner contrary to sanitary or other laws and regulations.
- (6) Wherever no market exists for a property which is being compulsorily acquired the price to be paid to the owner may at the discretion of the Tribunal be assessed on the basis of reinstatement.
- (7) The value of all separate interests in a property having a marketable value should be assessed in separate awards, but by the same Tribunal; and, so far as practicable, at the same time; claims for consequential damage, etc., being similarly dealt with.
- (8) The promoters should be allowed at any time within the period allowed for service of the notice to treat to serve a notice to treat in respect of any interest in land to operate as from any date not being later than the date fixed for the completion of the works, the price to be paid to be assessed as at the date of the service of the Notice to Treat.
- (9) Where there are persons or a body capable of receiving the purchase money as Trustees for the Vendors and their successors, the Vendors should not be considered as persons under a disability. In general, where the claimant can prove that acting reasonably he is put to special expense for re-investment, the costs of a single re-investment should be allowed in the items of the claim.
- (10) Promoters should have power to take part only of a property whenever they think fit. In cases where, as the result of the owner's claim for injurious affection, promoters find it cheaper to buy the whole site, and it happens that part of the whole projects beyond the limits of deviation, the promoter should have power to go to the Sanctioning Authority to obtain power for the additional area. The notice to treat could be amended accordingly.
- (11) Promoters should have power to acquire an easement in over or under land whenever such easement will be sufficient for the purpose of the undertaking.

Appendix A.

(12) The Promoters should be entitled to withdraw their notice to treat at any time within two months of the delivery of the claim, or such earlier or later date as the Tribunal may direct on the application of either party, on payment of all proper costs as between solicitor and client, and also on such compensation for loss or injury as in the opinion of the Tribunal has been occasioned by the notice to treat having been given and withdrawn.

(13) Notices to treat should be served within such period as the Sanctioning Authority may direct; or, if the Sanctioning Authority make no direction within 12 months of the order of the Sanctioning Authority conferring compulsory powers.

(14) Where Promoters acquire land which is subject to outside restrictions on its use, the Promoters should be entitled to use the land free from any such restrictions on paying compensation to the persons entitled to the benefit of such restrictions, if such persons are, in fact, damaged by the breach of such restrictions. And even where no application for land is pending before the Sanctioning Authority either because the land has been acquired by voluntary agreement or because no additional land is needed, it should be open to the Sanctioning Authority to extinguish or modify a restrictive covenant upon proper terms as to compensation or otherwise wherever they are of opinion that it is in the public interest that such covenant should be so extinguished or modified.

(15) The obligation of or offer by promoters to provide accommodation works for the benefit of vendors, and the nature of the works required, should be dealt with, in cases where the accommodation works are an integral part of the scheme, by the Sanctioning Authority when the scheme is sanctioned, and in other cases by the Compensation Tribunal when the compensation is settled.

In either case the benefit to the vendor of the accommodation works ordered, whether at the instance of the promoters or the vendor, should be taken into consideration by way of reduction in assessing the price to be paid for the land. It is recognised, however, that the Sanctioning Authority and the Compensation Tribunal should have power to postpone their decision as to accommodation works, in cases where they think that the question cannot be properly decided until sufficient time has elapsed to gauge the effect of the promoters' undertaking on the vendors' property.

(16) Subject to any limitations which the Sanctioning Authority in sanctioning a scheme may think fit to impose in special cases, promoters should have an unrestricted power to hold and dispose of surplus land, and any general statutory provisions as to the pre-emption rights of adjoining owners, etc. should, as regards schemes sanctioned by the Sanctioning Authority, cease to have effect.

(17) In every case the Sanctioning Authority should consider whether the minerals should be excepted from or included in a conveyance of land to promoters.

(18) (a) The Tribunal may, if the parties agree, consist of a single arbitrator appointed by them, but if the parties do not so agree, the Tribunal should consist of one arbitrator to be appointed by the Sanctioning Authority from a panel. In the ordinary case, we think that the Tribunal should be limited to one arbitrator, but in a special case the Sanctioning authority should have discretion, if it thinks fit, to appoint a larger and special Tribunal. It should be within the discretion of the Tribunal to exclude the public, but we think that as a rule publicity is desirable.

(b) Either party should be at liberty to obtain from the Inland Revenue Valuation Department any existing official valuations affecting the property in question, and such valuations should be admissible in evidence.

(19) (a) The Sanctioning Authority should have general authority to make rules as to the practice and procedure to be observed by the Tribunal, and the principles on which costs should be dealt with.

(b) We consider it essential that the claimant should be required to serve on the promoters full particulars of his claim, which should state the exact nature of the interest in respect of which compensation is claimed, and details of the Compensation claimed, distinguishing the amounts under separate heads and showing how the amount claimed under each head is calculated.

(c) Subject to any principles to be laid down by the Sanctioning Authority the Tribunal should have an absolute discretion as to costs, and it should be its duty to consider and determine in each case by whom and in what proportion such costs shall be borne.

(d) The Tribunal should have power to call expert witnesses, and both parties should be allowed to cross-examine such expert witnesses. The Tribunal should also have power to appoint an accountant to examine books and accounts, and to order all necessary books and accounts to be produced for the inspection of such accountant, who should be available for cross-examination by both sides. Taxation returns in the possession of the Inland Revenue Department should also be produced upon request by the Tribunal.

(20) (a) /

x x x x

Appendix A.

(22) (a) As a general principle where the State or a Local Authority by a particular improvement has increased the value of the neighbouring land, the State or Local Authority should be entitled to participate in such increased value.

(b) The principle of betterment applicable in the case of undertakings promoted by the State or by Local Authorities as aforesaid is also applicable in the case of private undertakings authorised in the public interest, but the share of private promoters in any betterment created by their undertaking should be subject to an over-riding limit that it should not exceed the actual cost of the construction of the undertaking.

(c) The promoters should schedule the limits of the area in respect of which it is proposed to claim betterment in respect of any property, and also specify the period at the end of which they propose that claims for betterment should be made. Any person having any interest in land within the scheduled betterment area should have the right of audience before the Sanctioning Authority as to such betterment, and should also have the right at any time after the works, so far as they affect his property, have been completed, to apply to the promoters and, failing agreement, to the Tribunal, for the immediate assessment of the betterment, if any, of his property, which it is estimated will result from the undertaking; and, further, upon payment of the capitalised value of the betterment charge, or, if there be no betterment, without payment, to obtain from the promoters a certificate of the discharge of his land from liability to betterment.

(d) Either the promoters or the owner should have the right to call on the Inland Revenue Valuation Department to make an official initial valuation for the purpose of assessing the betterment charge. This valuation when made should be supplied to both parties within a certain limited time, either party to have power to agree to or dissent from it, and if not dissented from within the limited period by either party, the valuation should be binding on both parties. The same procedure should be adopted for the final valuation. On each occasion each party should, in default of agreement, have the right to have the valuation of the property in question, or its betterment, assessed by the Tribunal. At the hearing before the Tribunal either party should have the right to call the Inland Revenue Valuer as a witness and to cross-examine him on his valuation.

- (e) The principle of betterment should be applied to all interests in land having a market value.
- (f) In normal cases 50 per cent. should be the percentage of betterment to be taken from the owner.
- (g) Where the promoter is a Local Authority the Sanctioning Authority should decide when sanctioning the scheme whether the whole of the Betterment should be retained by the Local Authority or whether some proportion should be paid to the State. In the case of a private promoter, if 50 per cent. of such Betterment exceeds the actual cost of construction of the undertaking, the excess should not be payable.
- (h) The annual charge should be five per cent. upon the capital value of the betterment assessed, or such other rate as the Sanctioning Authority, with due regard to the then current value of money, may determine, and should rank next after rates and taxes.
- (i) The mere fact that promoters may already have statutory power to take land should not preclude them from applying to the Sanctioning Authority to sanction a Betterment charge and to delimit the area.

(23) (a) In our opinion Injurious Affection falls into two classes:

- (i) Damage to an owner whose land is taken, arising directly from the taking, e.g. by severance or disturbance of Occupation.
- (ii) Damage arising from the construction or user of the works, which may result to an owner, none of whose land is taken, as well as to an owner, some of whose land is taken.

(b) We recommend that compensation for Injurious Affection under class (i) should in general follow as of course. In regard to Injurious Affection under class (ii), the Sanctioning Authority should exercise a discretion, allowing compensation for direct and substantial depreciation of market value, if they are of opinion that in the circumstances it is reasonable and expedient to do so. In making such Order, the Sanctioning Authority should have full discretion to impose terms or give directions to the Assessment Tribunal.

(c) The properties in respect of which a claim of Injurious Affection, under class (ii), may be made should be inserted in a schedule to be settled by the Sanctioning Authority at the time of sanctioning the scheme, and all such claims should be made within a limited time, similarly to be settled by the Sanctioning Authority.

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- (d) The assessment should not be postponed as in the case of Betterment, but take place once and for all upon the claim being made.
- (e) Claims for compensation for damage by maintenance or user of the type considered in para. 49 should be dealt with by the Assessment Tribunal, as and when they arise.
- (f) Damage caused by negligence or other unauthorised user of the works should, as at present, not be matter for compensation, but ordinary legal proceedings.

(32) Since the acquisition and Valuation of Land Committee reported the recommendations numbered 2,3,4,5,6,7 and 12 have been embodied substantially in the Acquisition of Land (Assessment of Compensation) Act, 1919; but that Act applies only to compulsory acquisition by a Government Department or by a local or "public authority". The expression "public authority" is defined as meaning "anybody of persons not trading for profit authorised by or under any Act to carry on a railway, canal, dock, water or other public undertaking. So far, therefore, as light railways are concerned the Act would appear to be of little value.

(33) With regard to the recommendation numbered 11, the same Act includes under the expression "land" any "easement or right in, to or over land or waters"; but, as already indicated, advantage cannot be taken of the Act by an ordinary light railway company trading for profit. The only specific reference to the acquisition of easements in the Light Railways Act of 1896 is that contained in Section 21 which applies to easements over or affecting "Commons". The Light Railways Act of 1912 contains no reference to the subject of easements.

(34) With regard to the recommendation numbered 18 (a), the Acquisition of Land (Assessment of Compensation) Act, 1919, provides for the reference of questions of disputed compensation to one of a panel of "official arbitrators" and prescribes how these arbitrators shall be appointed and paid. It also gives effect to the recommendation numbered 18 (b).

(35) The Act also gives effect to recommendation 19 (b) and, subject to certain limitations, gives the official arbitrator full discretion as to the costs of an arbitration.

(36) The question of Betterment referred to in recommendation 22 is not specifically dealt with in the Acquisition of Land (Assessment of Compensation) Act, 1919. It has since been examined by the Inter-Departmental Development Committee whose conclusions are embodied in the following extract from their Report:-

Conclusions.

- (1) There can, we think, be no question as to the justice of the principle of betterment.
- (2) Previous attempts to carry out the principle have mostly failed because the amount recovered has been small compared with the expense of valuation. A reservation must be made to this statement with reference to procedure under Town Planning Schemes. Few schemes have been completed, but, as is noted in the appendix, practice as regards betterment, so far as it has gone, is hopeful.
- (3) There appears to be no particular reason why the amount recoverable should be limited to half the enhanced value, as has been the practice hitherto. We consider that three-quarters of the betterment value should be made recoverable, as a balance of one quarter should be enough.
 - (a) to allow for a margin of error,
and
 - (b) to leave the owner some interest
in the proposed improvement.
- (4) The principle should apply not only to improvements carried out by public authorities but also to private undertakings authorised in the public interest, subject in that case to the over-riding limit that the amount recoverable shall not exceed the actual cost of the construction of the undertaking.
- (5) The procedure of the Acquisition of Land (Assessment of Compensation) Act, 1919, as regards the assessing Tribunal should be adapted to the assessment of betterment.
- (6) The amount of betterment should be settled by one valuation before the improvement is begun, as is provided in the Town Planning Acts.
- (7) As a rule betterment should be recovered by an annual charge, reckoned at a percentage upon the capital value of the betterment assessed. The percentage might be determined in accordance with the then current rate of interest charged by the Public Works Loan Board and the annual charge should be redeemable at par.
- (8) Where an improvement is to be carried out in a rural area by or with the assistance of a Public Body, we suggest that the following procedure might be substituted for the method of assessment suggested above, but based on the same principles. We feel that some procedure which would make betterment recoverable in the form of a local betterment rate would enable Public Authorities to contribute to the construction of new transport facilities in a simple and equitable manner and might in many cases eliminate the necessity for State aid.

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The Minister of Transport, or, subject to his approval, County Councils or County Boroughs should be enabled to define the area which they consider would benefit by the proposed improvement, and impose on that area a fixed annual betterment rate which might diminish in zones according to the distance from the facilities provided by the improvement. The total amount of the rate should not exceed the amount necessary to pay interest on, and amortize, the sum contributed by the public authority. Owners to have a right of appeal to the Assessment Tribunal if two-thirds of them in the area object to the proposed rate. The method of assessment of such a rate requires very careful consideration, and this Committee do not feel they have the requisite special knowledge to make more than a general recommendation on the subject.

- (9) The procedure advocated in the above recommendations is not intended to over-ride procedure under the Town Planning Acts where it is applicable, but we recommend that the betterment recoverable under those Acts should be increased to 75%.
- (10) We also recommend expert investigation with reference to the feasibility of the periodical separate assessment of all sites and buildings for ordinary rating purposes and as to the possibility of making Betterment recoverable as an annual charge at so much in the £ of rateable site value in the defined area, so that the amount collected would vary according to the actual effect which the Improvement had on site values.

FINANCIAL ARRANGEMENTS MADE BY THE STATE, LOCAL AUTHORITIES, ETC.

(37) It will have been gathered from paragraphs 20 to 23 that comparatively little advantage has been taken of the facilities afforded by Sections 4 and 5 of the Act of 1896 for obtaining financial assistance from the State for the construction of light railways in Great Britain. The reasons for this are indicated in paragraphs 24 to 26, and it may be well to summarise here the principal statutory provisions concerned.

(38) Under Section 4 of the Act a light railway company may seek a loan from the Treasury, but this is subject to the following conditions:-

(1) That the Council of a County, Borough or District concerned shall have agreed to make an advance to the company.

(2) That the amount to be advanced by the Treasury shall not exceed that advanced by the Council or one quarter of the total amount required by the company.

(3) That at least one half of the capital required by the company is provided by means of share capital, and that at least the half of this share capital has been subscribed and paid up by persons other than local authorities.

Thus, if the Council or Councils are willing to provide a quarter of the amount required the Treasury may provide another quarter, provided that one quarter of the total capital required is subscribed and paid up by the public including existing railway companies.

Loans under Section 4 bear interest at a rate of not less than $3\frac{1}{2}$ per cent and rank pari passu with the loans from the Councils.

(39) "Special" advances by the Treasury may be granted under Section 5, either as a free grant or as a loan, or partly a free grant and partly a loan; but this is subject to the following conditions:-

- (1) That the Board of Agriculture must certify that agriculture will be benefited; or the Board of Trade must certify that the railway is necessary for certain industrial purposes and cannot be constructed without State aid.
- (2) That an existing railway company is prepared to work the line.
- (3) That landowners, local authorities and other persons locally interested have given all reasonable assistance and facilities.
- (4) That no "Special" advance shall exceed one-half of the total amount required for the construction of the railway.
- (5) That other conditions and the rate of the interest may be determined by the Treasury.

(40) With regard to financial assistance which local authorities may render, Section 3 enables a council or councils to construct and work, or contract for the construction and working, of a light railway and to advance money to a company by loan or as part of the share capital of the company. Sections 11 and 16 provide that a light Railway Order may authorise a council to advance or borrow money for these purposes within stated limits and on certain stated terms, and may empower any local authority to acquire the railway.

The Light Railway Commissioners state that local authorities have not exercised their powers as to advances to light railways to the extent which might have been expected. They are more inclined to do so in the remoter districts, but the Commissioners think that some guarantee by way of public control and supervision of the expenditure of public money advanced would have tended to encourage them by giving confidence that the money would not be mis-spent in the hands of private investors. The Light Railways Act, however, make no provision of this kind.

(41) Under earlier Statutes landowners already possessed certain rights to construct railways upon their lands. Apart from this, under Section 19 of the Act of 1896 limited owners whose estate will be permanently benefited may sell land to a light railway company (with the consent of the Board of Agriculture) for less than its market value or may present it to the Company gratis. The same Section enables a landowner to contribute money for light railway purposes and to charge the estate in the manner provided by the Improvement of Land Act, 1864.

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(42) With regard to those light railway companies in Great Britain by whom grants, loans, etc. have been obtained from the Treasury or from local authorities, the following cases may be cited by way of example:-

(1) Derwent Valley Railway. In this case the joint District councils concerned agreed to guarantee 3% interest on the ordinary Stock (£50,000) for a period of 10 years, certain landowners undertaking to bear half this liability.

(2) Kelvedon, Tiptree & Tollesbury Railway. - This line was promoted by local landowners and others; and on an estimate of £45,500 the Treasury made a free grant of £16,000 - the actual cost ultimately amounting to £63,235.
The Promoters themselves made a contribution of £750, being half of the cost of certain lands which had to be purchased.
In this case some of the land required was obtained free.

(3) Shropshire & Montgomeryshire Ry. - Various sums amounting to £4,250 were contributed by the Shrewsbury Corporation and by two County Councils and 3 District Councils concerned.

(4) Southwold Railway - The Treasury, having instructed the Company to construct a connecting line to Southwold Harbour, made a free grant of £2,160, being half of the cost involved.

The following Tables contain a complete list of those cases in which "Special Advances" (free grants or loans) have been paid or promised by the Treasury under Section 5 of the Act 1896, together with a list of the Treasury Loans granted under Section 4 of the same Act, up to September, 1919.

(1) Special Advances under Section 5.

| Name of Light Railway. | Promised. | | Paid. |
|----------------------------------|-------------|----------|------------------------|
| | Free Grant. | Loan. | |
| Dornoch | 14,945 | - | 14,945 |
| Frazerburgh and St. Combs. | 5,000 | - | 5,000 |
| Kelvedon, Tiptree and Tollesbury | 16,000 | - | 16,000 |
| Tanat Valley. | 22,000 | 6,000 | 28,000 |
| Leak Caldon Low & Hartington. | 17,500 | 7,500 | 25,000 |
| Welshpool & Llanfair | 17,500 | 5,700 | 23,200 |
| Wick and Lybster | 25,000 | 3,000 | 28,000 |
| Mawddwy | 9,000 | - | 9,000 |
| Elsenham & Thaxted | 16,000 | - | 14,705 |
| Cromarty & Dingwall | 32,000 | 16,000 | 20,000 (Free grant) |
| Fraserburgh & Rosehearty. | - | 12,625 | - |
| Southwold Harbour | 2,700 | - | 2,160 |
| Swaledale. | - | 25,000 | - |
| Mid. Flintshire | - | 45,000 | - |
| Falkland. | - | 7,000 | - |
| Total | £177,645 | £127,825 | £186,010 |
| | £305,470 | | |

(2) Loans under Section 4.

| Name of Light Railway. | Loan. |
|----------------------------------|----------|
| Lauder. | £ 13,500 |
| Lampeter, Aberayron and New Quay | 20,000 |
| Llandilo & Lampeter. | 38,500 |
| Mid.Suffolk | 5,000 |
| | <hr/> |
| | £77,000 |

(43) In Ireland the slow growth of railway extension and the difficulty of obtaining capital even for main line railways, led to the idea of inviting Counties or Baronies concerned to guarantee interest on the whole or part of the necessary capital, such interest being secured by a charge on the local rates—vide paragraph 14. This principle was adopted on the main lines as early as 1849 and was frequently applied between that date and 1883. The usual rate of interest is 5 per cent, in a few cases it is 4 per cent, and in one case as low as $2\frac{1}{2}$ per cent. Almost all of those guarantees are for terms of years expiring between 1907 and 1931. Similar guarantees have been given in respect of many of the light railways also.

(44) The necessity for State assistance for light railways as recognised in the Tramways (Ireland) Act, 1883, which sanctioned State guarantees in partial relief of local guarantees.

A local guarantee ran from the date at which the relative capital was raised, but the State guarantee took effect only from the opening of the line for traffic. During the construction period, therefore, the entire charge for interest was thrown upon the guaranteeing area. The Act provided for the payment by the Treasury to the guaranteeing area of half the amount which the latter had disbursed by way of interest on capital, subject *inter alia* to the condition that the State contribution should not exceed 2 per cent on the guaranteed capital. Over and above this liability for interest the guaranteeing area has to make good any deficit that may arise in working, a condition which, in some cases, has imposed a serious burden. Further, in the event of such a deficit continuing for a period of two years or more the Act provides that the County Council shall take over the undertaking and become responsible for its working and maintenance at the cost of the guaranteeing area; and this provision has been enforced in several cases.

(45) The combination of State and Baronial guarantees did not, however, remove the difficulty experienced in raising capital and in 1886 the Public Works Loans Tramways (Ireland) Act was passed authorising the advance of money on the security of guaranteed shares to which the Government themselves were contributors.

(46) Under the Light Railways Act of 1889 the Treasury are authorised to assist new lines by free grants or by annual payments, or by a combination of both, provided that such lines are either promoted or maintained and worked by existing railway companies.

(47) These Companies, however, shewed little inclination to avail themselves of the Act and the Transfer

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of Railways (Ireland) Act, 1890, was passed authorising the Companies to contribute towards the expense of constructing lines which they were prepared to take over and enabling them to construct extensions uniform in gauge with their existing systems.

(48) With the co-operation of the Companies this measure resulted in guarantees not specifically provided for in the Act for the construction and equipment of the lines. Thirteen lines were constructed under the Acts of 1889 and 1890 and as the relative expenditure from public funds exceeded the sum allowed by the Act of 1889 the Light Railways Act of 1893 authorised an addition of £5,000 a year to the annuities previously sanctioned.

(49) The Tramways (Ireland) Act of 1895 empowers the Treasury to redeem their liability in respect of any guarantee given under the Act of 1883 by a lump sum payment not exceeding 33 1/3 times the estimated annual amount of such liability.

(50) In 1896 a further sum of £500,000 was provided by the Railways (Ireland) Act for the construction of light railways and for other purposes. Under this Act the Treasury could aid the construction of railways either by grant or loan, provided that existing companies agreed either to construct, work and maintain, or to work and maintain the lines when constructed. The assistance given might cover the entire cost of a line running wholly or mainly through a congested district, but was limited to half the cost in other districts. The guaranteeing councils were also empowered to give guarantees to presentment.

(51) Towards the construction of the lines laid down under the Tramways Act of 1883 and the Light Railways Acts of 1889 and 1896 a sum of £1,560,042 had been contributed from public funds up to the year 1910; and in addition an average annual contribution of £20,728 by way of interest on guaranteed capital was made by the Treasury for the 5 years ending 1908.

(52) It would appear that the system of Baronial contributions had thrown a very heavy burden upon the guaranteeing areas concerned and that, in the case of the lines more recently opened, Baronial guarantees have been difficult, if not impossible, to obtain, with the result that these later lines have had to be assisted by Treasury grants alone. The rate-payers in these latter areas thus escape financial burdens of the kind which are borne by those areas in which the earlier lines were constructed - a fact which appears to have created some discontent in the areas which are regularly called upon to fulfil their Baronial guarantees.

(53) As indicating how inequitable to the ratepayers the system of levying rates half-yearly may be, the case of the West Clare Railway is of interest. In this instance the railway financial year commences on the 1st May, and, while the County is liable under its Guarantee both for the dividends and for excess expenditure over receipts, the Treasury is liable only for one-half of the amount paid by the County for dividends, up to a limit of 2 per cent per annum on the amount of the Capital Guarantee.

In the pre-control period there was a considerable excess of expenditure over receipts in the winter half-year whilst, owing to the tourist traffic, there was a considerable profit on the working during the summer half-year. As a consequence, the Treasury reaped the benefit of the tourist receipts, obtaining thereby a considerable reduction of their maximum liability, while the whole of the deficit on the working expenses during the "lean" half-year had to be borne by the guaranteeing area.

(54) The results of the legislation governing the assistance of light railways in Ireland either by the Treasury or by local authorities are very fully set forth on pages 56-75, Volume VI, of the Report of the Vice-Regal Commission on Irish Railways - 1910.

(55) As an indication of the extent to which such assistance has been given the following examples are of interest:-

Ballycastle Railway.- A loan of £20,000 was obtained from the Board of Public Works but has now been paid off.

Cavan & Leitrim Railway.- The Board of Works constructed an extension ($4\frac{1}{2}$ miles in length) from Arigna.

Three Baronies in County Cavan guarantee a perpetual dividend of 5% on a sum of £48,000 and also undertake to bear any loss incurred in working; and three Baronies in County Leitrim guarantee a similar dividend on £154,000 with a like undertaking in respect of losses in working. In both cases the Treasury recoup the Baronies to the extent of 50% of the amounts disbursed by them - subject to a limit of 2% on the amount of the guaranteed Capital.

In 1913, when the Net Receipts were about £1,005 the Counties were called upon, under their Guarantees, to furnish sums amounting to more than £9,000.

Clogher Valley Railway.- The Board of Public Works, under a special Act, advanced a sum of £44,000 for 4,400 Guaranteed 5% Shares which were issued to them. These shares were subsequently sold on the Stock Exchange, the Board repaid and the premiums credited to the Company's Capital Account.

Certain Baronies guarantee interest at 5% on a sum of £123,310, and in 1913 the full amount of interest involved was demanded.

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Cork and Muskerry Railway.- Under the Act of 1883 the Grand Jury of County Cork guaranteed interest at 5% on a sum of £75,000, but, in 1913 at least, it was apparently unnecessary to make any call upon the guaranteeing area. The Company state that Parliament made a technical error in referring the relative Bill to a Committee of the House of Lords with the result that it had to be re-introduced at an expense to the Company of £1200 for which they obtained no redress.

The Company also state that the Vice-Regal Commission recommended a Treasury grant of £6,700 for the improvement of sidings, etc. but that no such grant could be obtained.

Cork Blackrock & Passage Railway.- Loans amounting to £65,000 at 4½% were obtained from the Board of Public Works.

Schull & Skibbereen Railway.- There is a Baronial Guarantee of interest at 5% on a sum of £57,000.

In 1913 there was a serious loss in working and the Guaranteeing area was accordingly called upon to fulfil its obligation.

Londonderry & Lough Swilly Railway.-

Letterkenny Line.- Loans amounting to £85,000 were obtained from the Board of Public Works, on which £35,000 is guaranteed by the City of Londonderry and certain Baronies.

Burtenport Railway.- Government grants for the construction of this line amounted to £318,847, and a sum of £5,000 is guaranteed by a Barony.

Carndonagh Line.- Treasury grants amounted to £98,527 and a sum of £5,000 was guaranteed by a Barony.

The Board of Works loans in respect of the Letterkenny Line are not yet fully paid off; The Commissioners are mortgagees in possession and work the line under an agreement with the Company. The Board also work the Burtenport and Carndonagh Lines on terms.

In 1913 the Company paid a dividend on the Ordinary Shares and the Guaranteeing areas were not called upon to make a contribution.

Timoleague/

Timoleague & Courtmacsherry Extension,
& Bellinscarthy & Timoleague
Junction Railway.

The Cork County Council guarantees interest at 5% on the whole Capital of £35,000, and in 1913 the Guaranteeing area was called upon to contribute about £2,590, covering 5% on the Guaranteed Stock and also a loss in working of about £840.

The Guaranteeing area also provided the rolling stock.

Tralee & Dingle Railway. Interest on a sum of £114,000 at 4% is guaranteed by certain Baronies and interest on a further sum of £6,000 is guaranteed by the town of Tralee.

The Guaranteeing areas have always been called upon to contribute to the full extent of their obligation.

When these Baronial Guarantees were arranged the Treasury agreed to recoup the County Council for their expenditure up to a limit of 2% on the amount of the Capital guaranteed by the Baronies; but this Treasury Liability was subsequently redeemed by a lump sum payment of £90,000, thus reducing the Capital to £40,000 for the interest on which the Baronies still remain liable.

The Treasury also made a free grant of £23,500 for deviations.

In 1913 the Company complained to the Treasury of the heavy burden which the Baronial Guarantees threw upon the areas concerned and urged that further assistance should be granted by the State, but so far no such assistance appears to have been received.

County Donegal Railways. The Treasury (through the Board of Public Works) constructed and equipped with rolling stock - free of charge - 43½ miles of the lines running to Glenties and Killybegs.

In respect of the Strabane and Letterkenny Line the Donegal County Council and the Letterkenny District Council guaranteed the dividend at 4% on the Ordinary Shares on amounts of £17,480 and £1,500 respectively.

(56) A complete Statement of the cases in which Treasury assistance has been given to Light railway undertakings in Ireland is contained in the following Tables:-

Appendix A.

STATEMENT SHOWING THE LOANS MADE BY THE BOARD OF WORKS TO AID IN THE CONSTRUCTION OF LIGHT RAILWAYS UNDER THE ACT 1 and 2 Wm. IV, Cap. 33 AND THE PUBLIC WORKS LOANS (TRAMWAYS) IRELAND ACT, 1886, 49 & 50 Vic.c.46.

| <u>Railway.</u> | <u>Amount Advanced.</u> |
|---|----------------------------------|
| | £. s. d. |
| Ballymena, Cushendall, and Redbay. | 27,700 0. 0. |
| Ballycastle. | 20,000 0. 0. |
| Ballymena and Larne. | 44,500 0. 0. |
| Cork and Bandon (Bantry Extension) | 35,000 0. 0. |
| Dublin and Lucan. | 10,000 0. 0. |
| Donegal (Co.Donegal Railways Joint Committee.) | { 40,000. 0. 0. 12,500. 0. 0. |
| Giants' Causeway, Portrush and Bush Valley Railway. | 10,000. 0. 0. |
| Letterkenny. | { 50,000. 0. 0. 35,000. 0. 0. |
| Cavan and Leitrim. | 56,000. 0. 0. |
| Clogher Valley | 44,000. 0. 0. |
| Cork and Muskerry. | 18,700. 0. 0. |
| Donegal (West Donegal Light Railway) | 7,000. 0. 0. |
| West Clare. | 54,400. 0. 0. |
| Cork, Blackrock & Passage (Crosshaven Extension) | 65,000. 0. 0. |
| | <u>£539,600. 0. 0.</u> |

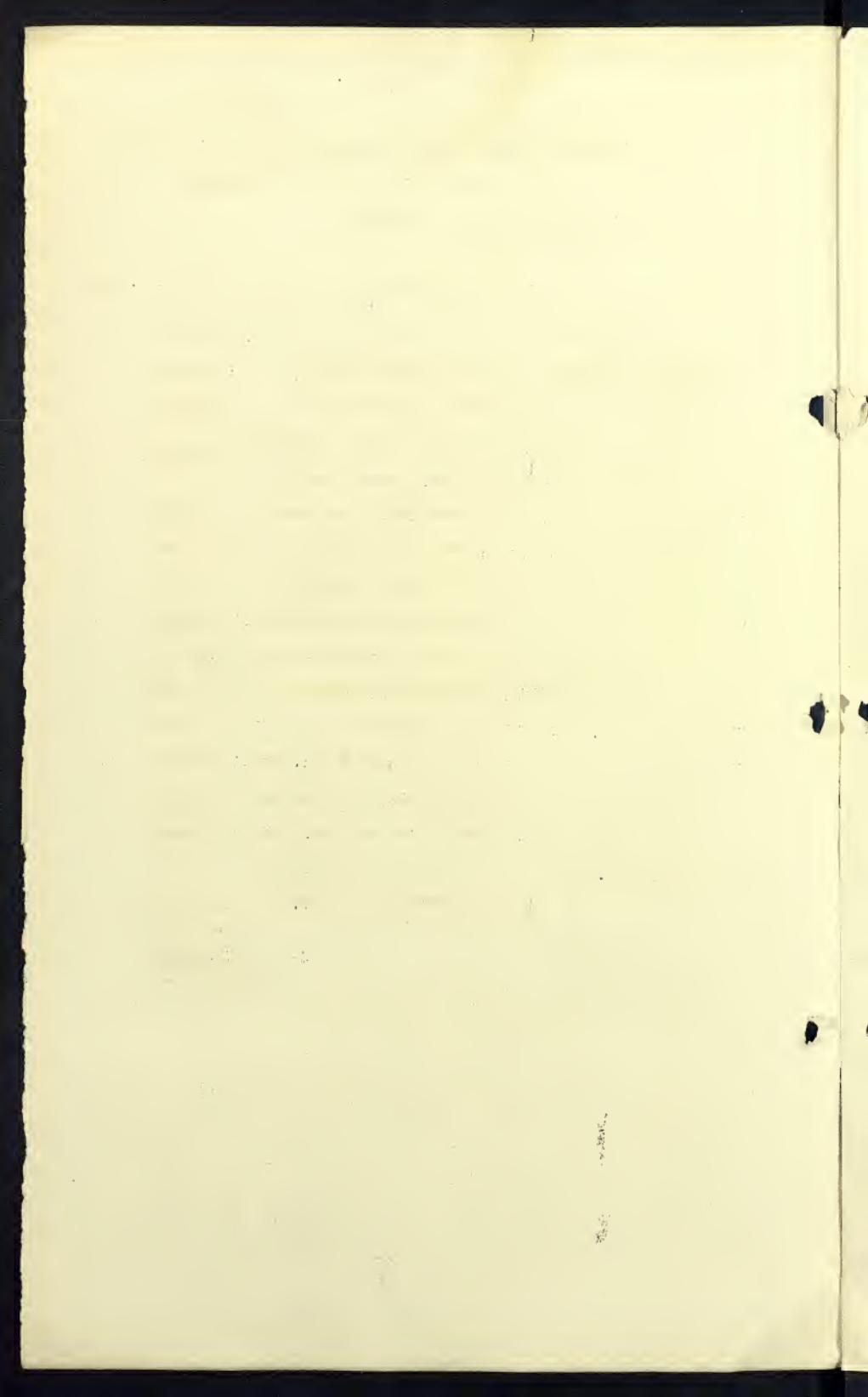
STATEMENT SHOWING THE LIGHT RAILWAYS ON THE PAID-UP GUARANTEED SHARE CAPITAL OF WHICH THE GOVERNMENT HAVE, UNDER THE TRAMWAYS AND PUBLIC COMPANIES ACT. 1883, UNDERTAKEN TO CONTRIBUTE, IF NECESSARY, A MAXIMUM SUM OF 2 PER CENT PER ANNUM.

| <u>Acts.</u> | <u>Railway.</u> | <u>Maximum Treasury Liability.</u> |
|--|---|------------------------------------|
| Tramways and Public Companies Act, 1883. | Cork & Muskerry. | 1,500 |
| | Clogher Valley Tramway | 2,640 |
| | Cavan and Leitrim | 4,040 |
| | West Clare. | 3,270 |
| | Carrickfergus Harbour Junction. | 130 |
| | Mitchelstown & Fermoy. | 1,200 |
| | Schull and Skibbereen. | 1,140 |
| | West Donegal. | 380 |
| | Dublin and Blessington. | 800 |
| | Ballinascarthy & Timoleague Junction, and Courtmacsherry Extension. | 700 |
| | Loughrea and Attymon. | 1,089 |
| | Tralee and Dingle. | 2,400 |
| | Ballinrobe and Claremorris. | 1,433 |
| | South Clare. | 2,400 |
| | Donoughmore Extension. | 600 |
| | Tuam and Claremorris. | 1,960 |
| | Donegal and Killybegs. | 20 |
| | Headford and Kenmare. | 1,200 |
| | Killorglin and Valentia. | 1,400 |
| | Stranorlar and Glentios. | 20 |
| | Collooney and Swinford. | 1,600 |
| | Claremorris and Swinford. | 800 |
| | | <u>£30,722.</u> |

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STATEMENT SHOWING THE LIGHT RAILWAYS CONSTRUCTED
IN IRELAND BY THE AID OF GOVERNMENT
MONEY.

| Act. | Railway. | Government Grant. |
|----------------------------------|----------------------------|-------------------|
| | | £ |
| Railways Acts, 1889 and 1893. | Ballina and Killala. | 44,000 |
| " | Bantry Bay Extension. | 14,940 |
| " | Claremorris and Swinford). | 146,042 |
| | Collooney and Swinford } | |
| " | Downpatrick & Ardglass. | 29,980 |
| " | Galway and Clifden. | 264,600 |
| " | Headford and Kenmare. | 49,984 |
| " | Killorglin and Valentia. | 85,000 |
| " | Westport and Mallastranny. | 131,400 |
| " | PRELIMINARY EXPENSES. | 7,321 |
| " | Achill Extension. | 72,578 |
| " | Baltimore and Skibbereen. | 56,700 |
| " | Donegal and Killybegs. | 121,436 |
| " | Stranorlar and Glenties. | 123,886 |
| Railways Act, 1896. | Bunerana and Garndonagh. | 98,527 |
| " | Letterkenny & Burtonport. | 313,648 |
| | | <u>£1,560,042</u> |



APPENDIX B.

LIGHT RAILWAYS IN THE UNITED KINGDOM.

Financial Position and Prospects.

(1) The financial position of the Light Railway Undertakings of the United Kingdom immediately prior to the War is indicated in paras. 5 to 8 of this Appendix and in the accompanying Tables, in which a comparison is made between the expenditure, net receipts, etc. of Light and Heavy Railways respectively. It will be seen that, with a very few exceptions, the position of the Light Railways was then such that they could shew only a diminutive return upon their capital or were actually shewing a deficit.

(2) Since that time they have been subject to the adverse economic influences arising out of the war. The cost of material has greatly advanced, and in addition to this the wages, hours and conditions of labour have altered in such a way and to such an extent that - notwithstanding the increase in rates and fares - the financial difficulties of the undertakings are very greatly increased.

(3) It will be seen from Table A.1 that the percentage of Total Expenditure to gross receipts in the case of Light Railways is only slightly greater than in the case of the Heavy Railways. When it is borne in mind that the receipts of the former are frequently very small and that, in such cases, their expenditure - even though rigid economy be exercised - must absorb a very large proportion of the earnings, it would seem that the financial difficulties of Light Railway undertakings in Great Britain can hardly be attributed to extravagance in the matter of Annual Expenditure.

(4) The figures in Table A.2 shew, it is true, that on these light railways the cost of the Maintenance and Renewal of Way and Works forms a somewhat larger proportion of the total expenditure; but, on the other hand, the cost of the Maintenance and Renewal of Rolling Stock forms a much smaller proportion than in the case of the heavy railways. The Locomotive Running and Traffic Expenses (taken together) amount in each case to about one-half of the total expenditure.

(5) From the figures in Table B it will be seen that the Net Receipts of the Heavy Railways in Great Britain (in respect of Railway services proper, excluding Steamboat, Dock, Hotel and other subsidiary services) yielded an average return of 3.63 per cent on the amount of the Capital raised and ranking for dividend. For Light Railways the corresponding figure was only 2.29 per cent. Moreover, the figures of Capital taken for purposes of calculation include the amounts applicable to Steamboat and other subsidiary services; and in the case of the heavy railways the proportion of the total capital which is thus applied is much greater than in the case of light railways.

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The actual disparity between the average returns on capital is greater, therefore, than the foregoing figures indicate.

(6) Further, in arriving at the figure of 2.29 per cent in respect of the light railways, the returns for the Burry Port and Gwendreath Valley Railway and the Ferrett Railway have been included. These two lines are of standard gauge and, carrying as they do a heavy mineral and industrial traffic, their earnings in proportion to the amount of their capital are unusually large. They can hardly be regarded as "typical" light railways, and if they were to be omitted from Table B. the average proportion of Net Receipts to Capital for the light railways in Great Britain would be reduced from 2.29 per cent to 1.90 per cent. Similarly, if these and certain other lines of a somewhat similar character were excluded, the percentage of 66.6 shewn in Table A.1 as representing the proportion of Total Expenditure to Gross Receipts would be appreciably increased.

(7) Taken in conjunction with the figures in Tables A.1 and A.2 the returns embodied in Table B. would seem to point to the broad conclusion that the poor financial results obtained from light railway working in Great Britain are due not so much to any failure to exercise economy in the matter of working expenses as to the smallness of the earnings in relation to the capital of the undertakings concerned, i.e. that, broadly speaking, the amount of traffic with which they have to deal is insufficient to produce a reasonable return upon the capital on which dividend is payable. It may be that this is due, in some measure, to excessive capital expenditure. In the case of the heavy railways the Gross Receipts for 1913 (from Railway services only) amounted to about 9.9 per cent of the total capital, whilst in the case of the Light Railways included in Table B. the proportion was only about 6.8 per cent. Here again the actual disparity was probably greater than that indicated by the figures, owing to the fact that the figures of Capital taken for purposes of calculation include the amounts applied to subsidiary services such as are not usually carried on by light railway undertakings.

(8) With regard to Light Railways in Ireland the position is not quite the same - vide Table C. In this case the percentage of Net Receipts to Capital works out at 2.0, a figure which approximates to that arrived at in respect of the lines in Great Britain, but the proportion of Expenditure to Gross Receipts is appreciably higher, namely 79.6, as against 66.6 per cent. At the same time the Gross Receipts of the lines included in Table C. amount on the average to about 9.7 per cent of the Capital on which dividend is payable. It should be explained, however, that Irish Light Railways have been financed by the Treasury to a greater extent than similar undertakings in Great Britain and that the total capital sum of £1,845,648 shewn at the foot of Table C. falls far short of the actual amount of capital raised by the lines concerned. In order to arrive at a more just comparison the following sums should perhaps be added to the amount shewn in the Table :-

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| | | £ |
|------------------------------------|--|-----------------|
| Londonderry & Lough Swilly Railway | ... Grants | 417,374 |
| ditto. | ... Loan | 85,000 |
| Tralee & Dingle Railway | ... Grant | 23,500 |
| ditto. | Payment by Treasury in redemption of liability for Dividends up to $\frac{2}{3}$ on Capital of £120,000 | ... 80,000 |
| ditto. | Ordinary Share Capital not yet ranking for Dividend. | ... 30,000 |
| | Total | <u>£635,874</u> |

The addition of this amount would raise the total capital sum shewn in Table C. to £2,481,522; and, taking this as the basic figure, the proportion of Net Receipts to Capital and of Gross Receipts to Capital would work out at 1.2 per cent and 7.2 per cent respectively.

On the whole, therefore, the figures would seem to suggest not only (a) that the financial difficulties of Irish light railways (like those of similar lines in Great Britain) are due to the smallness of their earnings in relation to the amount of their capital and that this capital itself may be excessive; but also (b) that these difficulties are aggravated by the extent to which the gross earnings are absorbed in the payment of working expenses.

TABLE A.1.

Statement shewing Proportion of Total Expenditure to Gross Receipts of (a) Heavy Railways and (b) Light Railways in Great Britain, for the year 1913. (The figures are taken from the Railway Returns for 1913).

| ITEM | HEAVY RAILWAYS. | | LIGHT RAILWAYS. | |
|----------------------|-----------------|---------|-----------------|---------|
| | AMOUNT | percen- | AMOUNT | percen- |
| | £ | TAGE | £ | TAGE. |
| Total Gross Receipts | 123,346,166 | 100.0 | 204,830 | 100.0 |
| Total Expenditure | 78,114,216 | 63.3 | 136,504 | 66.6 |

TABLE A.2.

Statement showing, as percentages of the Total Expenditure, the amounts spent under various heads (a) by Heavy Railways and (b) by Light Railways in the Year 1913.

| Expenditure on | HEAVY RAILWAYS | | LIGHT RAILWAYS | |
|---|----------------|---------|----------------|---------|
| | Amount. | percen- | Amount. | percen- |
| | £. | TAGE. | £. | TAGE. |
| Maintenance & Renewal of Way and Works. | 11,868,958 | 15.2 | 25,529 | 18.7 |
| Maintenance & Renewal of Rolling Stock | 13,322,329 | 17.1 | 15,320 | 11.2 |
| Loco. Running | 17,447,018 | 22.3 | 38,976 | 28.6 |
| Traffic. | 23,438,964 | 30.0 | 30,632 | 22.5 |
| General Charges. | 2,634,646 | 3.4 | 13,279 | 9.7 |
| Remaining Expenses. | 9,402,301 | 12.0 | 12,768 | 9.3 |
| Total Expenditure. | 78,114,216 | 100.0 | 136,504 | 100.0 |

TABLE I.

Comparative Statement shewing Proportion of Net Receipts (from Railway Services only) to Total Capital (a) of Heavy Railways and (b) of Light Railways in Great Britain for the Year 1913.

| Railway. | Gross Receipts. | Total Expenditure | Net Receipts. | Total Capital raised and ranking for Dividend. | Percentage of Net Receipts to Capital. |
|---|-----------------|-------------------|---------------|--|--|
| Heavy Railways. | £ 123,346,166 | £ 78,114,816 | £ 45,231,950 | £ 1,245,576,260 | 3.63 |
| <u>Light Railways:-</u> | | | | | |
| Avonmouth. | 23 | 263 | Dr. 260 | 13,430 | Def. 1.98 |
| Bideford, Westward Ho & Appledore. | 2,070 | 2,845 | Dr. 775 | 94,166 | Def. .62 |
| Bradford Corporation Kidd Valley | 2,620 | 1,879 | 941 | 58,126 | 1.62 |
| Durry Port & Gwendreath Valley | 35,049 | 21,626 | 13,423 | 203,470 | 6.59 |
| Clebury Mortimer & Bilton Priors | 6,450 | 3,398 | 3,052 | 113,792 | 2.68 |
| Corringham | 2,274 | 1,280 | 994 | 14,300 | 6.95 |
| Corris | 1,909 | 2,061 | Fr. 122 | 20,000 | Def. .61 |
| Derwent Valley | 2,693 | 2,420 | 273 | 89,141 | .31+ |
| Easingwold | 2,179 | 1,891 | 206 | 15,800 | 1.82 |
| East & West Yorkshire Union Ffestiniog | 19,097 | 9,338 | 9,759 | 338,638 | 2.88 |
| Forsett | 4,543 | 2,245 | 2,298 | 34,800 | 6.72 |
| Glyn Valley | 4,800 | 3,296 | 1,504 | 56,643 | 2.65 |
| Kent & East Sussex | 1,316 | 6,451 | 2,865 | 196,262 | 1.46 |
| Knott End | 5,729 | 4,794 | 935 | 210,500 | .45 |
| Carry Forward | £ 110,201 | 72,052 | 38,149 | £ 1,611,854 | - |

* The Derwent Valley Railway was only opened in July, 1913. The figures given above do not therefore represent the result of a year's normal working.

TABLE B. Continued.

| Railway. | Gross Receipts. | Total Expenditure | Net Receipts. | Capital raised & ranking for Dividend. | Percentage of Net Receipts to Capital. |
|--|-----------------|-------------------|---------------|--|--|
| Carried Forward | £. 110,201 | £. 72,052 | £. 38,149 | £. 1,611,854 | - |
| Llanelli & Myndydd Mawr. | 17,669 | 12,844 | 4,825 | 104,300 | 4.63 |
| Lynton & Barnstaple. | 8,666 | 6,340 | 3,026 | 127,368 | 2.38 |
| Mid-Suffolk. | 5,817 | 4,872 | 945 | 190,300 | .49 |
| North Sunderland. | 1,900 | 1,148 | 752 | 28,020 | 2.68 |
| North Wales Narrow Gauge. | 2,066 | 2,594 | Dr. 328 | 126,406 | Def. .26 |
| Portmadoc, Beddgelert & South Snowdon. | 455 | 429 | 26 | 50,000 | .05 |
| Redruth & Chasewater. | 2,310 | 2,404 | Dr. 94 | 57,000 | Def. .16 |
| Rowrah & Helton Fell. | 1,082 | 725 | 357 | 46,230 | .78 |
| Shropshire & Montgomeryshire. | 4,593 | 3,649 | 944 | 40,500 | 2.33 |
| Snailbeach. | 343 | 341 | 2 | 26,300 | - |
| Southwold. | 5,401 | 3,598 | 1,803 | 67,400 | 2.68 |
| Weston, Clevedon & Portishead. | 3,752 | 3,230 | 522 | 141,700 | .37 |
| Swansea Impts. & Tramways. | 27,415 | 12,565 | 14,850 | 217,583 | 6.82 |
| Campbeltown & Machrihanish. | 2,867 | 2,306 | 561 | 29,304 | 1.92 |
| Wick & Lybster. | 2,820 | 2,636 | 184 | 42,500 | .43 |
| Total | £ 198,359 | £ 121,833 | £ 66,526 | £ 2,906,764 | 2.29 |
| Bishop's Castle | 4,407 | 2,884 | 1,523 | Not available | - |
| Dornoch. | 2,064 | 1,767 | 277 | -do- | - |
| Totals. | £ 204,630 | £ 126,504 | £ 68,326 | - | - |

NOTE: From the foregoing list of Light Railway Companies the Plymouth, Devonport and South Western Junction Company and the Blackpool and Fleetwood Tramway Co., have been excluded. The figures relating to the former include those respecting a part of the London and South Western main line (which is owned by the smaller Company), and would therefore be misleading.

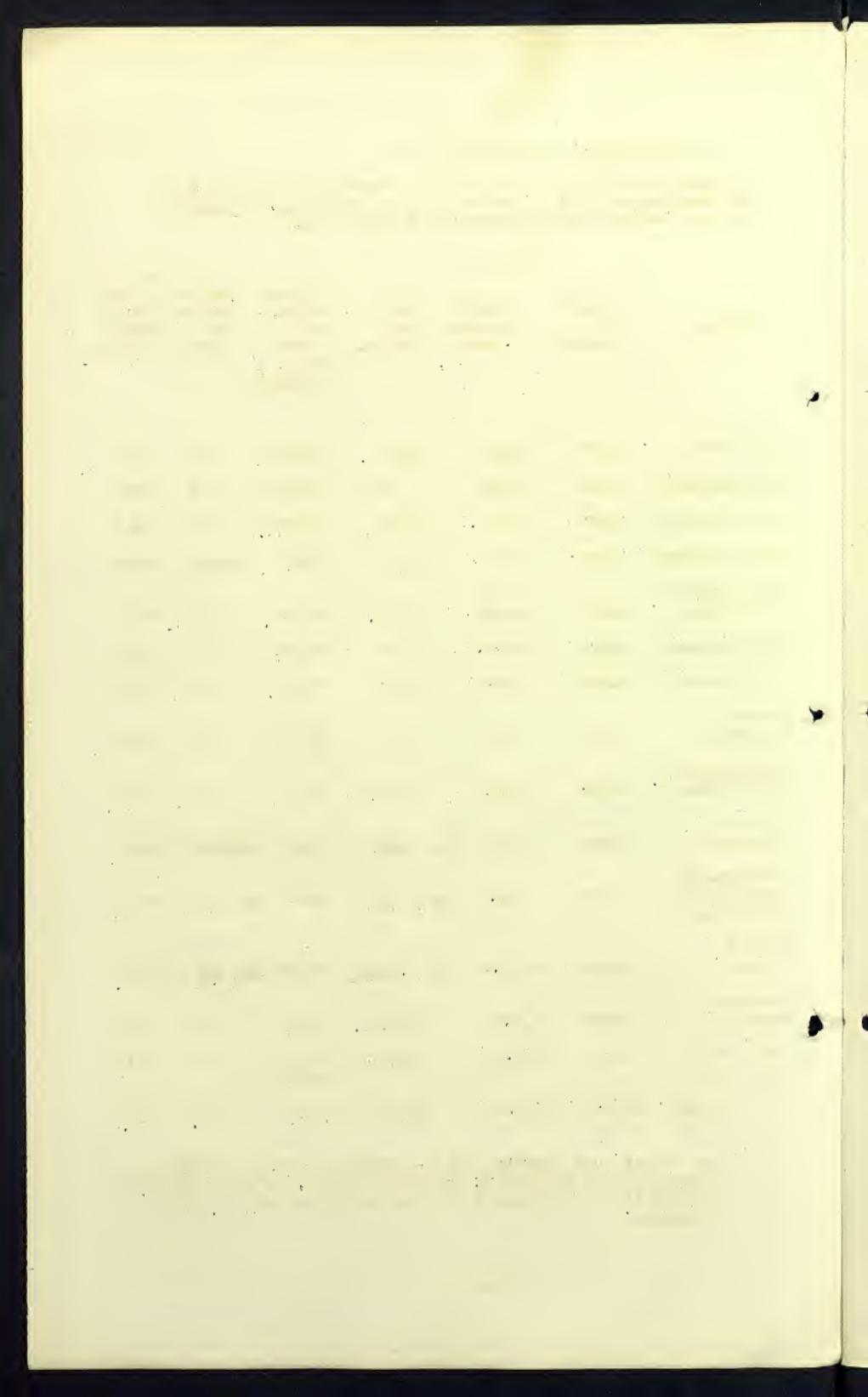
APPENDIX B.

TABLE C - LIGHT RAILWAYS IN IRELAND.

Statement shewing (a) Net Receipts as a percentage of Capital and (b) the Proportion of Total Expenditure to Gross Receipts. (The figures are taken from the Railway Returns for the year 1913.)

| Railway. | Gross Receipts. | Total expenditure. | Net Receipts. | Capital raised and ranking for Dividend. | Percentage of Net Receipts to Capital. | Expenditure to Gross Receipts. |
|---|-----------------|--------------------|---------------|--|--|--------------------------------|
| Ballycastle. | 6,436 | 5,248 | 1,188 | 89,809 | 1.3 | 81.5 |
| Bessbrook & Newry. | 1,358 | 1,326 | 32 | 15,000 | .2 | 97.6 |
| Cavan & Leitrim. | 13,995 | 12,910 | 1,085 | 194,685 | .6 | 92.2 |
| Clogher Valley. | 9,100 | 9,368 | Dr. 268 | 123,310 | Def. 2 | 102.9 |
| Cork, Blackrook & Passage. | 16,904 | 10,436 | 6,468 | 426,270 | 1.5 | 61.7 |
| Cork & Macroom. | 22,608 | 13,911 | 8,697 | 211,830 | 4.1 | 61.5 |
| Cork & Muskerry. | 11,377 | 7,566 | 3,811 | 75,000 | 5.1 | 66.5 |
| Listowel & Ballybunion | 3,352 | 2,612 | 740 | 33,000 | 2.2 | 77.9 |
| Londonderry & Lough Swilly. | 44,074 | 28,460 | 15,614 | 153,494 | 10.2 | 64.6 |
| Schull & Skibbereen | 3,399 | 5,520 | Dr. 2,121 | 57,000 | Def. 3.7 | 162.4 |
| Timoleague & Courtmacsherry Extn. etc., | 1,830 | 2,669 | Dr. 839 | 35,000 | Def. 2.4 | 145.8 |
| Tralee & Dingle. | 10,881 | 14,180 | Dr. 3,299 | 40,000 | Def. 8.2 | 130.3 |
| Waterford & Tramore. | 8,432 | 4,741 | 3,691 | 71,250 | 5.2 | 56.2 |
| West Clare), South Clare) | 25,061 | 23,381 | 1,680 | 180,000) 140,000) | .5 | 93.3 |
| Totals. | 178,807 | 142,328 | 36,479 | 1,845,648 | 2.0 | 79.6 |

NOTE: The Donegal Joint Committee and the Northern Counties Committee Railways are not included in the foregoing list, and as the capital of these lines is included in that of the Midland and Gt. Northern Companies.



LIGHT RAILWAYS IN THE UNITED KINGDOM.

Description of the Standard of Construction -

Cost of Construction,

(1) In any attempt to describe the standard of construction of light railways, the question of gauge is naturally the first to claim attention; but, in selecting this particular feature of construction for prior treatment, it is necessary to emphasise the fact that a departure from standard gauge is not an essential characteristic of "light" as distinct from "heavy" railways. A light railway may be of normal gauge or it may not, and the erroneous tendency to regard the terms "light" and "narrow gauge" as synonymous is no doubt due to the fact that, in the nature of things, the question of departing from the normal practice has arisen most frequently in connection with the promotion of light railway undertakings. Possibly no question of railway practice has been the subject of so much controversy, nor is there any other feature of construction upon which such divergences of opinion still exists. The advantages which have been claimed for and the objections which have been raised to the adoption of narrow gauges are briefly summarised in paragraphs 2 to 16 below; and it is to be presumed that in determining the various gauges to which light railways in the United Kingdom have been constructed the promoters have duly weighed the arguments for and against a departure from the normal practice.

(2) Although the question of the suitability of narrow gauges for railways of light construction has long been the subject of expert enquiry and debate, no final and authoritative conclusion has so far emerged. The fact that the discussion has been so prolonged and that a cleavage of opinion still remains may perhaps be taken to indicate that there is much to be said on both sides and that the advantages and disadvantages of a narrow gauge are more evenly balanced than either its advocates or its opponents are prepared to admit.

(3) It is generally accepted that an appreciable saving in the cost of construction is affected by the adoption of a narrow gauge. The extent of this economy has been variously estimated. Prior to the year 1900 various authorities had estimated it at amounts ranging from £400 to £1000 per mile. Taking the case of a railway in Ireland on the 5 foot 3 inch gauge, constructed to carry main line rolling stock, and comparing it with a more lightly constructed line of 3 foot gauge, another authority (quoted by Mr. J.C. Mackay) placed the amount of the probable saving at about £1650 per mile.

(4) As against this, however, Mr. W.H. Cole, writing in 1899, quoted a statement made by Sir John Wolfe Barry to the effect that the saving due to the adoption of a 3-foot gauge (instead of the 5 foot 3 inch gauge) for a number of proposed light railways in Ireland did not average more than about £500 per mile. At the same time it is to be borne in mind that survey expenses and establishment charges are not determined by the choice of gauge.

(5) It may be admitted that, in hilly country, the adoption of a narrow gauge allows of the introduction of steeper gradients and sharper curvatures than would otherwise be possible; and this bestows upon the engineer a greater flexibility and freedom of adjustment in dealing with the physical difficulties which he may have to overcome. The cost of earthwork is of course dependent to some extent upon gauge but the saving due to differences of gauge alone is not proportionate to that difference. The cost of earthwork is more largely dependent upon grade and curvature and, where the adoption of a narrow gauge allows a greater latitude in respect of curvature, considerable opportunities for the exercise of economy may be presented. On the other hand, if the engineering difficulties to be overcome occur at only a few points on the route of the railway concerned and are not characteristic of the whole, the prospective saving on earthworks, etc., may not be sufficiently great to warrant the selection of a narrow gauge.

(6) In respect of width of formation a narrow gauge has some advantage, but even the saving thus effected is confined to the elimination of a vertical strip of soil having a width equivalent to the differences of gauge; and it is not therefore so considerable as might at first seem probable. Moreover, it frequently happens that, in order to secure the maximum capacity in wagons and coaches, the width of the rolling stock of narrow gauge railways approaches that of a standard gauge stock, with the result that the actual saving in width of formation is inconsiderable.

(7) Where a light railway has to be laid upon a public road and where, consequently, space and curves of small radius are matters of great importance a departure from the standard gauge offers a manifest advantage.

(8) It is admitted, also, that a reduction of gauge renders possible a considerable reduction in the width, and therefore in the cost, of ballast; and the cubic capacity of sleeper material required is also appreciably reduced. On the other hand it has been emphasised by the advocates of the standard gauge that the gross cost of permanent way is dependent to a far greater extent upon factors which have little or no reference to gauge, e.g. upon the weight and section of the rails which are governed in turn by considerations of speed and axle load.

(9) The cost of bridgework is largely independent of gauge, being governed to a great extent by other factors such as length of span, moving load, depth of foundations for abutments and the like. Similarly, the cost of stations, sheds and siding accommodation is little affected by gauge whilst the quantity, and therefore the cost, of rolling stock is determined mainly by considerations of traffic.

(10) One of the objections most frequently raised to the adoption of a narrow gauge is that the free circulation of standard gauge rolling stock is precluded, that the separation of systems thus entailed involves the transhipment of goods at the point of connection and that this, apart from being itself a source of additional expenditure, leads to delays and to claims for demurrage, pilfering and damage. In some circumstances, where

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military or naval considerations have to be taken into account, a break of gauge may prove inconvenient from a strategical standpoint; and there is also the consideration that the adoption of standard gauge for a light railway may admit of the use of second-hand rolling stock purchased from main line companies.

(11) Some authorities, however, maintain that the inconveniences due to break of gauge - especially where the narrow gauge railway has a considerable length of lead - are liable to be exaggerated and that the disadvantages involved are outweighed by the savings effected in other directions, both in cheapness of construction and simplicity of operation. It is urged, for example, that the cost of transhipment may be reduced by the use of containers transferable to main line wagons or by the use on the narrow gauge line of wagons which can be transferred entire to the main line, or the bodies of which are so transferable. With regard to the use of containers, however, it has to be borne in mind that these are heavy appliances, that freight charges will be payable to the main line in respect of them, that they may have to return empty to the narrow gauge system and that the use of them may entail the provision of cranes at small stations where such hoisting apparatus would not otherwise be necessary. The necessity for transhipment has been obviated at a few places on the Continent by fitting telescopic axles to the rolling stock, but there seems to be no marked inclination to extend the practice.

It seems to be more or less agreed that on narrow gauge railways in Great Britain a higher proportion of paying load to dead load has been attained.

(12) In an interesting report respecting light railways in Ireland, where considerable experience of the working of 3-foot lines have been obtained, the Director General of Transport in that country recognises the advantage which narrow gauge railways possess in certain circumstances; but he points out at the same time that, in districts where narrow and broad gauge lines are contiguous, the diversity of dimension has rendered the question of the grouping or unification of the Irish Railways more difficult than it would otherwise have been. As an instance of this he cites the case of a 3-foot line connecting two of the main line systems. A large part of the traffic carried by this light railway is destined for places beyond the points of connection with the main lines; and, although it may be that the cost of transhipment at these points is compensated for by economies in working, the Director General has expressed the view that in such a case the connecting link should preferably have been constructed to the normal gauge, and that in any future development of light railways in Ireland the normal (5foot 3inch) gauge should be adopted - except in an area where a group of narrow gauge lines is already in existence.

(13) With the same report there has been submitted a memorandum by Colonel O'Brien who possesses a very intimate knowledge of Irish light railway systems. He lays considerable stress upon the saving of capital expenditure which is effected by narrow gauge construction and upon the high ratio of paying load to dead load which has been attained in narrow gauge operation. He urges that the

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adoption of the normal (5 foot 3 inch) gauge for a light railway burdens the undertaking with an increase in capital expenditure equivalent to at least 25 per cent, or about £2,000 per mile; and, taking the cost of transhipment at one shilling per ton (for traffic amounting to say 50,000 tons per annum) he contends that this expense still falls far short of the additional annual charge which would be involved if standard gauge construction were adopted. His experience leads him to the broad conclusion that, if the Irish light railways which are now of narrow gauge had been constructed to the broader gauge instead, the poor financial results obtained therefrom would have been poorer still.

(14) On the other hand it should be mentioned that the Allport Commission (appointed in 1885) deprecated the encouragement given to narrow gauge construction in Ireland as being a "serious error", entailing additional expenditure for transhipment together with a loss of through traffic in goods and live stock, whilst the saving effected in cost of construction was alleged to have been not more than from £500 to £700 per mile.

(15) In a Paper read before the Institution of Mechanical Engineers in July 1912 on the subject of "Rolling stock on the principal Irish Narrow Gauge Railways", Mr. R.M. Livesey, M. I. Mech. E., contended that narrow gauge construction should only be resorted to in cases where the cost did not exceed £5,000 per mile (and then only if it was manifest that the proposed line would be for ever isolated from systems of normal gauge) and where the traffic was always likely to be small.

(16) It is probably not generally realised that on the 3'6" gauge Railways in South Africa heavier engines and more spacious rolling stock with a better proportion of live load to tare weight are in daily operation than is the case on British Railways of 4'8½" gauge, or that on 2'6" gauge Railways in India the width of coaches is 7'6" and that wagons carry a load of 16 tons. The whole question of break of gauge seems to be primarily dependent on length of lead and upon the absence of a prospect of connection with a main line system. The question is, for what length of lead will the interest on the reduced capital cost of a narrow gauge railway compensate for the slightly higher ratio of working expenses to gross earnings and, in addition, for the cost of transhipment and the delays involved therein? From foreign experience it would seem probable that, in normal circumstances, equality in these respects would be reached in the United Kingdom with a lead of from 20 to 30 miles, and that at any rate with a lead of under 20 miles the advantage would generally rest with a light railway of normal gauge.

(17) Of the light railways in Great Britain included in the table in paragraph 19 of Appendix A, relating to the "History of Past Development and Legislation" nearly two-thirds are of normal gauge, and the mileage of these is almost exactly double that of the lines of narrow gauge. In Ireland, on the contrary, only about 25 per cent of the light railways included in the same table are of normal gauge and the mileage of these broad gauge lines is

little more than one-seventh of that of the narrow gauge systems.^x

(18) In Great Britain, where departures from the normal occur, the 1'11 $\frac{1}{4}$ " (60-centimetre), 2'6", 3'0" and 3'6" gauges appear to have been preferred by promoters. About 60 per cent of the total number of narrow gauge undertakings have adopted one or other of these dimensions and the number of lines in each of the four categories is the same. The remainder are of 1'0", 2'0", 2'3", 2'4" or 2'4 $\frac{1}{2}$ ", 2'7 $\frac{1}{2}$ ", 2'8 $\frac{1}{2}$ ", 3'6", 4'0" and 4'6" gauges, with no marked preference shown for any of these dimensions in particular. The total mileage of line in the United Kingdom of each of the narrow gauges mentioned above, is shown in Table C. at the end of this Appendix.

In Ireland, on the other hand, there has been a notable uniformity of practice, the 3-foot gauge having been adopted almost invariably as the alternative to the normal (5'0") gauge.

The total mileage of line in the United Kingdom, of all gauges is shown in Table C. at the end of this Appendix.

(19) In the majority of cases in which light railway promoters in the United Kingdom have elected to adopt a narrow gauge it is difficult to determine for what reasons precisely the choice was made, or why, in Great Britain, so many different narrow gauges were selected. The length of lead would not appear to have been a potent determining factor even in the case of those narrow gauge lines which make connections with main lines. Most of the narrow gauge lines in Great Britain make such connections, but comparatively few of these lines have a lead of more than 15 miles. Some of the narrow gauge lines in Ireland are of considerable length, but even there only a minority have a lead of over 50 miles and it is the rule, even for the shorter lines, to make connection with the main lines. The evidence available would seem to indicate that in Great Britain narrow gauges have been adopted, as a rule, in cases where lines have had to be laid through "difficult" country and/or in cases where rigid economy in the cost of construction was essential. The Festiniog, the North Wales Narrow Gauge, the Lynton and Barnstaple and the Vale of Rheidol Railways - all of which make connection with the neighbouring main lines - may be taken as furnishing instances in which the necessity for limiting the cost of construction through difficult terrain was considered sufficiently imperative to warrant departure from the normal gauge. In the case of isolated narrow gauge lines - such as the Campbeltown and Machrihanish Railway - the desire for economy in capital expenditure was naturally unaffected by any question of transhipment. Where this question did not arise the inclination of promoters towards the adoption of narrow gauges was naturally stronger than in cases where main line connections had to be considered.

^x Note. - In these calculations certain lightly constructed Irish lines of normal gauge, such as the Galway and Clifden Railway and the Achill Extension have not been accounted "light" railways in the true sense of the term, as they are in effect important sections of the large main line systems.

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(20) In Ireland almost every narrow gauge railway makes connection with a main line of the normal (5'3") gauge, and in that country the difficulty of raising the necessary capital from private sources was no doubt mainly responsible for the policy which has led to the creation of an extensive system of 3-foot railways linked up with the broad gauge main line systems.

(21) It is not suggested of course that, either in Great Britain or in Ireland, decisions to depart from normal gauge have been taken without a consideration of factors other than those to which reference has been made above. As indicated in the foregoing paragraphs the choice of gauge is not dependent upon estimates of the cost of construction and of transhipment alone, and it must be presumed that, as a general rule, all the factors mentioned above have been taken in account.

(22) Permanent Way.

With regard to other features of light railway construction, details of the permanent way of a number of typical undertakings in the United Kingdom are set forth in the annexed Table "B"; and, as these details are dependent to some extent upon gauge, axle loads and speeds, the figures in respect of these features are also included in Table B.

(23) Fencing.

With regard to the provision of fencing a few light railways in Ireland (notably the Cavan and Leitrim and the Clogher Valley Lines) are unfenced to an appreciable extent; but it is the general practice, both in Great Britain and Ireland, for light railways to be fenced throughout.

Post-and-wire or post-and-rail fencing is most frequently preferred, reinforced concrete or iron standards being occasionally used in fences of the former type. Hedging is also a fairly common form of protection and in some instances stone walls are provided. In a few cases, more especially in Ireland, the lines are enclosed by banks and ditches.

(24) Protection at Public Roads.

For purposes of protection at public roads in Great Britain the use of cattle guards and warning notice boards is fairly common, the precaution being accompanied in some instances by speed limits of from 5 to 10 miles per hour. On some lines no gates at all are provided; but in other cases, where cattle guards are used, these are only provided at the less important road crossings and the more important crossings are provided with gates. On certain lines, however, gates are provided at every level crossing. Where gates exist and are not operated by station staff they are usually attended by gatekeepers and are occasionally locked with the relative signals.

(25) In rare instances (as in the case of the Kelvedon, Tiptree and Tollesbury Railway) crossing gates are opened by the fireman and closed by the guard of each train. On the Tanat Valley Railway cattle pits are

usually provided at road crossings; but at the more important crossings gates exist and are operated by the train staff.

(26) The use of signals at road crossings, although it is resorted to on a few railways, does not appear to be usual, being generally limited to places at which the crossings are approached by curves.

(27) In Ireland the practice with regard to road protection is more uniform than in Great Britain, gates and gatekeepers being provided in the great majority of cases. At a few crossings (e.g. on or adjacent to curves) signals are used. Cattle guards are of rare occurrence. Where a line runs on or adjacent to a public road the practice varies. In one case there may be no protection at all apart from a speed limit, in another fencing may be erected on one side of the railway, whilst in a third the line itself may be laid upon a causeway raised well above the road level.

(28) It has been represented, with regard to future development of light railways in the United Kingdom generally that greater simplicity in the matter of road protection is desirable and especially that a wider use might be made of cattle guards, the provision of which would obviate the heavy charges now incurred in the payment of gatekeepers and in the provision and maintenance of their huts and cottages.

(29) With regard to the design of cattle guards it might be mentioned that these have been tried with and without pits on the Kelvedon, Tiptree and Tollesbury Railway, each pit being 5 feet long, 5 feet wide and having the bottom 2 feet 9 ins. below rail level for the retention of water, which was intended to act as a further deterrent to live stock. The pits, however, proved troublesome to maintain and are now considered unnecessary. The cattle guards of the other type consist of horizontal grids of 4" x 4" wooden triangular slats, which are laid on each side of a road between the rails, and between the rails and fences, for a distance of 12 feet parallel to the rails.

(30) Special Works.

The extent to which special works, such as long tunnels, bridges and viaducts and heavy earthwork, are necessary is mainly dependent, of course, upon the physical features of the district served. In the majority of cases the necessity for abnormal expenditure upon such works appears to have been successfully avoided in light railway construction in the United Kingdom; but in some instances costly works of the kind have had to be carried out, and there is little doubt that these involve an unfortunate addition to the financial burden which the undertakings concerned are called upon to bear.

(31) In a few instances this burden is relieved by the grant of a bonus rate or of a bonus mileage. The Force Railway Company, for example, possesses a seven-arched brick-and-stone viaduct over the River Tees, the cost of which at present-day prices would probably amount to about £25,000; and in respect of this

viaduct the Company receives a bonus rate of 2d. per ton. On the Plymouth, Devonport and South Western Junction Railway there is a large viaduct, 10 chains in length, over the River Tamar. It is constructed of concrete blocks and cost about £65,000 - a sum which represents a very considerable proportion of the total capital of the undertaking - and, for purposes of charging, the length of the viaduct is taken as 3 miles. Similarly in the case of the Shropshire and Montgomeryshire Railway, a bonus mileage of 2 miles is receivable in respect of traffic passing over each of two bridges across the Severn. Instances such as those are, however, rather the exception than the rule: in the great majority of cases no such compensation is received in respect of the cost of special works.

(32) Station Accommodation.

The number of stations and halts provided on light railways in the United Kingdom is considerable in relation to the extent of their route mileage. In Great Britain the intervals between stations and halts in the majority of cases are under 2 miles, whilst in Ireland the intervals are slightly greater than in Great Britain. Here and there a station has been permanently closed, presumably for reasons of economy; but such instances appear to be isolated.

(33) The building accommodation provided is usually fairly liberal, booking offices, waiting rooms and lavatory accommodation being frequently provided. Goods sheds also are provided at many places. On one or two lines platforms do not exist, but these cases are exceptional. As a general rule they are provided and are substantially constructed and of considerable height and length. Opinions differ as to the necessity for platforms but it has been pointed out that, where a light railway is of standard gauge, the provision of platforms may admit of the use of second-hand rolling stock purchased from a main line Company.

(34) At the great majority of stations ample yard, roadway and loading dock accommodation exists; and cattle pens are provided where necessary.

(35) At important stations cranes are commonly provided. As a rule these are hand cranes, with capacities varying from 10 cwt., upward to 5 tons. In a few cases there are travelling cranes capable of lifting varying weights up to 10 tons.

(36) On some lines weighbridges are provided at all, or nearly all, stations; but as a rule these appliances are limited to the more important leading and unloading points.

(37) Special facilities for transhipment at points where lines of narrow and normal gauge connect are not frequently found. As a general rule the work of transhipment is done by manual labour, cranes being used, where these are available, for heavy goods.

(38) In some instances difficulty and delay in the exchange of traffic are said to be occasioned by the

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lack of siding accommodation. Longer and additional sidings are said to be required.

(39) Workshops.

In Great Britain as a general rule the light railway undertakings possess small general workshops and locomotive running repair sheds of their own in which all the lighter repairs can be done; but heavy repairs are usually entrusted to outside contractors or to main line companies. In Ireland a considerable number of the light railways have workshops capable of dealing with all repairs to engines and rolling stock; but in a few cases heavy repairs are carried out elsewhere."

(40) The actual pre-war cost of light railway construction cannot be definitely ascertained, as, owing to the fact that original shares have commonly been issued at varying end heavy discounts, there has frequently been a wide disparity between the nominal amount of capital issued and the actual cash amount of the capital raised for the purpose. The nominal amounts of capital raised in a number of typical cases are shown in Table A. below.

TABLE A.

| Name of Railway. | Date of Opening | Nominal Capital, including Grants and Loans per Route Mile. £ | Physical Features etc., of District. |
|--------------------------------------|-----------------|--|---|
| Campbeltown and Machrihanish. | 1905 | 4,910 | Mainly "easy agricultural country. No abnormal works involved. Gauge 2'3". Siding accommodation not extensive. Passenger and freight traffic about 73 and 27 per cent respectively. |
| Cleobury Mortimer and Ditton Priors. | 1908 | 9,504 | Very hilly country. Gauge 4'8½". Siding accommodation not extensive. Freight traffic (largely roadstone) - about 83 per cent of total. |
| Derwent Valley. | 1913 | 7,566 | "Easy" Agricultural Country, Gauge 4'8½". Fairly extensive sidings. Freight traffic (mainly agricultural) - about 74% of total. |
| East Kent. | 1916 | 25,262 | Rolling country. Gauge 4'8½". Considerable length of second track and sidings. Freight traffic (mainly coal) 90% of total. |

Appendix C.

| Name of Railway. | Date of Opening. | Nominal Capital including Grants and Loans per Route Mile. £ | Physical Features etc., of District. |
|--|------------------|---|---|
| Forcett. | 1866 | 12,445 (including advances made out of Revenue) | Gently undulating country. Viaduct over 300 feet long: estimated present-day cost - £25,000. Gauge 4'8½". Heavy rails. Extensive sidings. Freight traffic only - mainly limestone and coal. |
| Hundred of Manhood and Selsey. | 1897 | 3,301 | Rolling agricultural land and flat marsh country. Gauge 4'8½". Traffic mainly agricultural, with holiday season traffic also. |
| Kent & East Sussex. (Original section of 12½ miles). | 1900 | 6,367 | One half is valley land and remainder is hilly and rolling country. Gauge 4'8½". Siding accommodation about normal. Traffic mainly agricultural. |
| Ballycastle. | 1880 | 6,806 | "Easy" agricultural country. Gauge 3 ft. One 180 foot tunnel. Sidings not very extensive. Traffic mainly agricultural. |
| Clogher Valley. | 1887 | 3,333 | Wide valley; undulating ground. Gauge 3 feet. Sidings not very extensive. Traffic mainly agricultural. A considerable part of line is laid on public roads. |
| Cork and Muskerry. | 1887 | 4,225 | "Easy" agricultural country. Gauge 3 ft. Small proportion of sidings. Traffic mainly agricultural. |

(41) A careful investigation has been made respecting the present day cost of construction and equipment of light railways and it may fairly be assumed to be now (July 1921) in the neighbourhood of two and half times the pre-war cost, ranging probably between a maximum of three times and a minimum of twice the pre-war cost according to local circumstances. It seems probable that by next year the lower figure (of twice the pre-war cost) may be reached, but it is very doubtful if any further reduction can be anticipated for several years to come.

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(43) It should perhaps be added that a standard gauge light railway undertaking may require less capital for purposes of equipment than if it were of narrow gauge, as it may be possible in the former case to meet requirements by the purchase of second-hand main line rolling stock; and it may be possible also to deal with exceptional or seasonal increases of traffic by hiring the necessary additional vehicles from a main line. A narrow gauge undertaking, on the other hand, must not only purchase new rolling stock but must have constantly in its possession a sufficient quantity thereof to enable it to deal with all periodical fluctuations in the volume of traffic.

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TABLE B

LIGHT RAILWAYS IN THE UNITED KINGDOM.

Summary of Details of Construction of Permanent Way.

| Name of Railway Kilage | Route | Gauge | PERMANENT WAY | | | | | | Gradients | Curves | Maximum Axle-load Used | Maximum Permitted | Speed Booked (incl.) | Maximum Authorised. | | | |
|---------------------------------------|---------|--------|-------------------------------------|----------|--|--------------------|---|----------------------------|----------------------|-----------------------------|------------------------------|------------------------------|----------------------------|------------------------|------|----------------|--------|
| | | | Ballast | | Sleepers | | Rails | | | | | | | | | | |
| | | | Depth under sleepers | Nature | Size | No. per mile | Weight per Yard and Sections | Maxi- mum G.W. in | Ruling G.W. in | Minimum Running Lines | Radius Sidings | | | | | | |
| GREAT BRITAIN. | | | | | Ins. | | | | | | | Gh. | Gh. | Tons | Tons | M.P.L. | M.P.M. |
| Axholme Joint | 27. 64½ | 4. 8½ | Ashes | 12 | 9' x 10" x 5" | 2120 | 32 lbs. and 75 lbs. F.B. | 67 | - | 12 | 5 | 13.97 | 14 | 22 | 25 | | |
| Burry Port & Gwendraeth Valley | 21. 18 | 4. 8½ | Slag & Ashes | 9 | 9' x 10" x 5" | 1920 | 65-75 lbs. F.B. | 40 | - | 6 | - | - | - | - | - | 1 | 25 |
| Campbeltown & Machrihanish | 6. 29 | 2. 3. | Ashes or Broken Stone | - | 4'6" x 9" x 4½" | 2112 | 50 lbs. F.B. | 35 | - | 5.4 | - | - | - | - | - | 15 to 20 | 20 |
| Cleobury Mortimer & Ditton Priors. | 12. 00 | 4. 8½ | Ashes & Broken Stone | - | 8' x 10" x 4½" | 1980 | 72 lbs. F.B. Secondhand | 60 | - | 10 | - | 13 | 14 | 10 | 25 | | |
| Derwent Valley | 16. 1 | 4. 8½ | Ashes | 8 | 9' x 10" x 5" | 1936 | 65 lbs. (partly worn) | 150 | - | 12 | - | 15.6 | 14 | 25 | 25 | | |
| East & West Yorkshire Union | 9. 3 | 4. 8½ | Ashes on Rubble | 12 | 9' x 10" x 5" | 1936 | 85 lbs. Single strand | 68 | - | 12 | - | 5 | 10 | 25 | 25 | | |
| East Kent | 10. 27½ | 4. 8½ | Collicry Refuse | 11 | 9' x 9" x 4½" | 1920 | 60-90 lbs. F.B. | 50 | - | 9 | 6 | 12 | 14 or 15 | 20 | 25 | | |
| Ffestiniog | 13. 62 | 1. 11½ | Gravel | 1 to 4 | 4'6" x 8" x 4" on sharp curves | 1936 2112 | 50 lbs. D.H. and B.H. | 69 | 92 | 1.75 | 1 | 6 | 6 | 17 | - | | |
| Forrest | 4. 67½ | 4. 8½ | Stone | - | 9' x 10" x 5" | 1600 | 82 lbs. D.H. 65 lbs. (only a few on sidings) | 60 | - | 13.5 | 9 | W.L.R. Locomos and Stock. | 15 | | | | |
| Glyn Valley | 8. 63 | 2. 4½ | Gravel | 12 | 5' x 10" x 5" | 1760 | 50 lbs. F.B. | 25 | 50 | 3 | 6 | 2 | 2.5 | 12 | 12 | | |
| Hundred of Merwood & Selsley | 7. 25 | 4. 8½ | Gravel | 10 | 9' x 10" x 5" (Part worn) 8' x 10" x 5" 8' x 8" x 4" 9' x 10" x 5" | 2000 | 45,47,50 & 60 lbs. F.B. | 40 | - | 6 | 5 | 8 | - | 15 | | | |
| Kelvedon, Tiptree & Tollesbury | 10. 4 | 4. 8½ | Gravel | 12 | Shingle & Ashes | 1936 | 85 lbs nominal B.H. 78 lbs actual (G.L.R.) | 50 | - | 10 | 6 | 13.99 | 14 | 15.5 | 25 | | |
| Kent & East Sussex | 23. 00 | 4. 8½ | Shingle & Ashes | 10 | 6' x 10" x 5" | 1920 | 82 lbs nominal D.H. (part worn) | 50 | - | 10 | 5 | 12.6 | 14 | 25 | 25 | | |
| Knott End | 11. 29 | 4. 8½ | Cinders or Gravel | 6 | 9' x 10" x 5" | 1760 | 90 lbs. B.H. | 72 | - | 10 | 15 | 12.5 | 8 | 16 | 25 | | |
| Lampster, Abersyron & New Quay | 12. 14 | 4. 8½ | Slag & Stone, Crushed Slag | 13 | 9' x 9" x 4½" | 1760 | 89 lbs. Flanged 70 lbs. F.B. 80.5 lbs. B.H. on some curves | 40 | 40 | 12 | 6 | 9 | 14 | 13.5 | 25 | | |
| Lynton & Barnstaple | 19.25 | 1.11½ | Broken Stone | 11 to 13 | 4'6" x 9" x 4½" | 1760 | 40 lbs F.B. | 50 | - | 4 | 3 | 3.7 | - | 14 | 16 | | |
| | | | | | | | | | | | | (3.5 at loops) | | | | | |

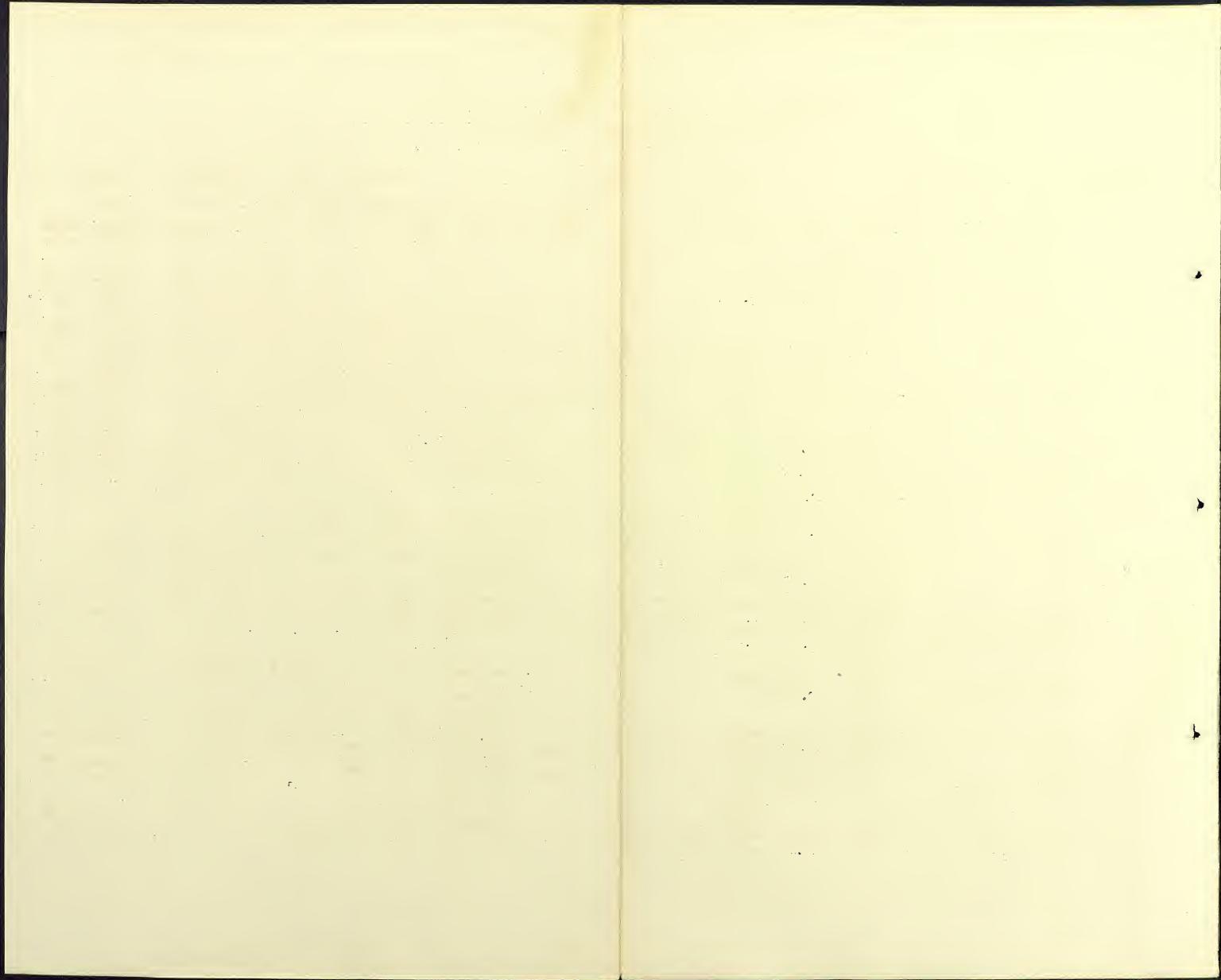


TABLE E.
LIGHT RAILWAYS IN THE UNITED KINGDOM.

Summary of Details of Construction of Permanent Way.

Appendix C.

| Name of Railway | Route Mile-age | Gauge | PERMANENT WAY. | | | | | | | | Maximum Axle-load | | Maximum Speed | | | |
|--|--------------------|-------|------------------|-----------------------------------|----------|---|------------------------------|--|---------------|--|-------------------|--------|---------------|-----------|----------------------------------|----------------|
| | | | Ballast | | Sleepers | | Rails | | Gradients | | Curves | | Used | Permitted | Booked (Incl.) | Authorised. |
| | | | Nature | Depth under Sleepers | Size | No. per mile | Weight per Yard and Sections | Maximum ONE in | Ruling ONE in | Minimum Radius Running Lines : Sidings | Grs | Grs | Tons | Tons | M.P.H. | M.P.H. |
| | | | M. Ch | ft. in | Inch | | | | | | | | | | | |
| Mid-Suffolk | 19 35 | 4 | 8 $\frac{1}{2}$ | Ashes | 6 | 9' x 10" x 5" 8' x 9" x 4 $\frac{1}{2}$ " 9' x 9" x 4 $\frac{1}{2}$ " | 1836 2044 | 56 lbs F.B. 56 F.B. | 40 50 | 50 - | 20 9 | 7 - | 8 5 | 10 12 | 18.4 16 | 25 |
| Midd Valley | 5 77 $\frac{1}{4}$ | 4 | 8 $\frac{1}{2}$ | Broken Stone | 15 | | | | | | | | | | | |
| N.Wales Narrow Gauge | 12 40 | 1 | 11 $\frac{1}{2}$ | Broken Stone or Gingers or Gravel | 7 | 4'6" x 9" x 4 $\frac{1}{2}$ " | 1760 | 41 $\frac{1}{2}$ (Indian State) | 40 | - | 3.75 | - | 4 | - | Very low | 25 |
| Plymouth, Devonport and S.W. Junction (Bere Alston & Callington) | 9 54 | 4 | 8 $\frac{1}{2}$ | Broken Stone | 9 | 8' x 9" x 4 $\frac{1}{2}$ " | 1936 | 80 lbs nominal (part worn) | 38 | - | 7.5 | 6 | 12 | 14 | 17 | 20 |
| Saundersfoot | 6.60 | 4 | 0 | - | - | - | 45 lbs | - | - | - | - | - | - | - | - | - |
| Shropshire & Montgomeryshire | 24 45 | 4 | 8 $\frac{1}{2}$ | Gravel or Stone & Ashes | 6 | 8' x 8' x 4" | 1760 | 70 lbs P.H. | 30 | - | 10 | 6 | 9 | 10 | 20 | 25 |
| Southwold | 9 64 | 3 | 0 | Sand & Gravel | 9 | 6' x 6" x 3" | 2268 | 30 lbs F.B. | 66 | 66 | 12 | 3 | 4 | 4 | 16 | 16 |
| Tamai Valley | 15 -- | 4 | 8 $\frac{1}{2}$ | Ashes, Gravel & Chippings | 4 | 7'6" x 9" x 4 $\frac{1}{2}$ " 8'6" x 10" x 5" | 1936 | 66 lbs F.B. | 63 | - | 8 | 6 | 10.62 | 14 | 15.9 | 25 |
| Vale of Rheidol | 11 60 | 1 | 11 $\frac{1}{2}$ | Gravel | 4 | 8' x 9" x 4 $\frac{1}{2}$ " 9' x 10" x 5" | 1760 | 48-60 lbs F.B. | 48 | 50 | 2 | 3 | 6 | - | - | 20 |
| Walshpool & Llanfroair. | 9 6 | 2 | 6 | Broken Stone & Gravel | 5 | 6' x 9" x 4 $\frac{1}{2}$ " | 1936 | 45 lbs F.B. | 30 | - | 2.5 | 3 | 6.8 | 3 | - | 25 |
| Waston, Clevedon & Portishead | 14 31 | 4 | 8 $\frac{1}{2}$ | Broken Stone | 9 | 9' x 9" x 4 $\frac{1}{2}$ " | 1760 | 60 lbs F.B. | 68 | - | 16 | 5 | 10 | 12 | 20 | 25 |
| Wolverton & Stony Stratford | 2 44 | 3 | 6 | Concrete | - | Name | - | 80 lbs (Grooved) | 21 | - | 1.6 | .47 | 2.95 | - | 8 | 8 to 10 |
| IRELAND. | | | | | | | | | | | | | | | 18 to 20 | 24 |
| Ballycastle | 16 11 | 3 | 0 | Sand & Gravel or Stone | 8 | 6'6" x 10" x 4" | 2260 | 45 lbs. Worn to F.B. 42 or 43 lbs. Also 75 lbs. F.B. | 48 | 50 | 10 | 4 | 10.75 | - | - | |
| Bessbrook & Newry | 3 - | 3 | 0 | Gravel | - | 6' x 8" x 4" | 1760 | 25 lbs | - | 7 | - | - | 2.26 | 2 | 6 | - |
| Cavan & Leitrim | 48 58 | 3 | 0 | Broken Stone & Gravel | 10 | 6' x 8" x 4" | 2600 | 45 lbs F.B. | 30 | - | 4 | - | 6 | 8 | 20 On Branch Line 12 14 | 25 12 25 |
| Clogher Valley | 37 00 | 3 | 0 | Stone & Gravel | 12 | 6' x 8" x 4" | 2150 | 45 lbs F.B. | 30 | 40 | 1.5 | 1.5 | 9 | 9 | Alongside Road..... | 12 |

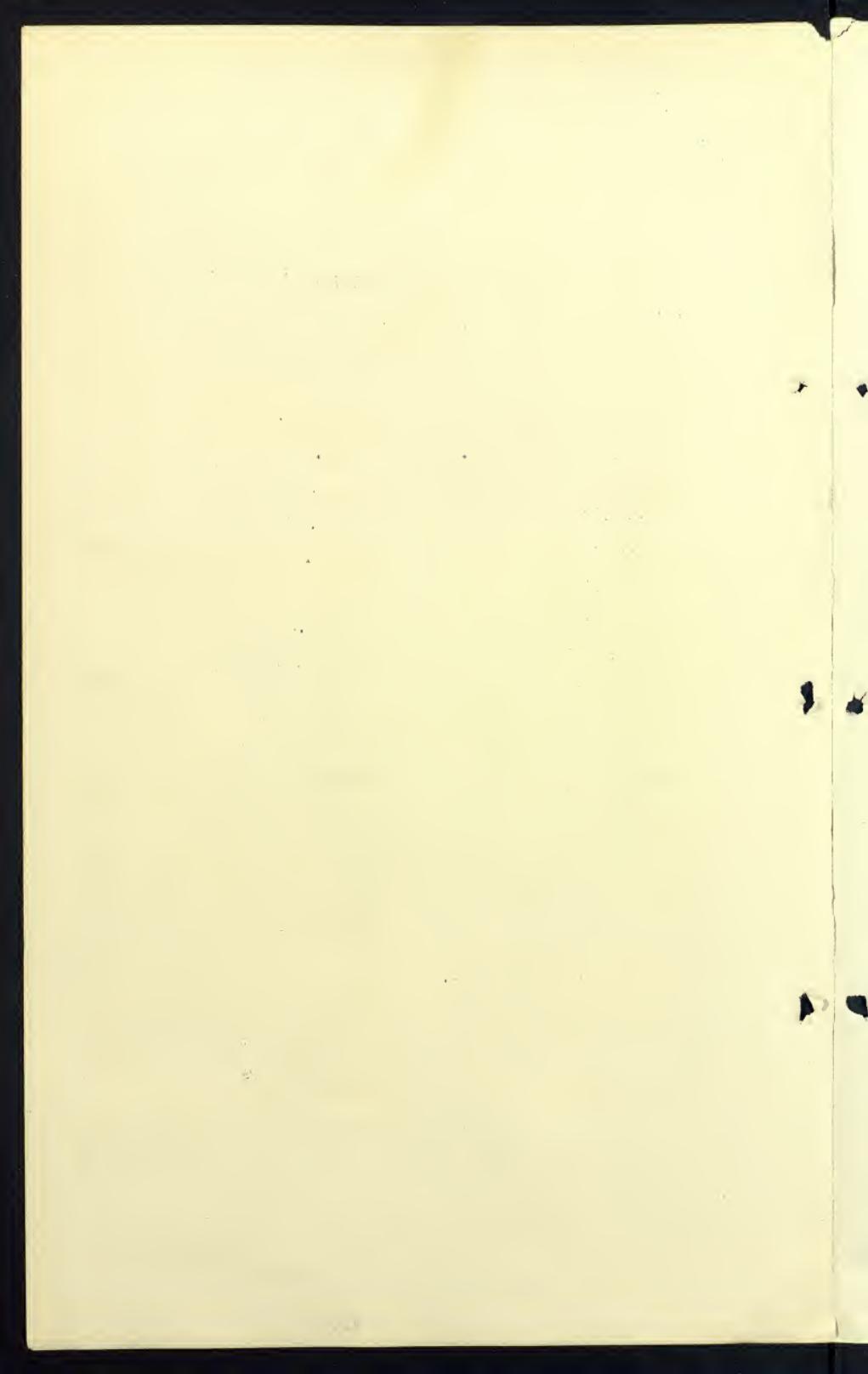




TABLE C.

Statement relating to Light Railways in the United Kingdom, shewing Gauge and Total Length of Line of each Gauge.

| <u>Gauge.</u> | <u>Mileage.</u> |
|------------------------|-----------------|
| 1' 3" | 7.25 |
| 1" 11½" | 61.37 |
| 2' 0" | 4.50 |
| 2' 3" | 24.29 |
| 2' 4" | 3.16 |
| 2' 4½" | 8.63 |
| 2' 6" | 29.81 |
| 2' 7½" | 5.00 |
| 2' 8½" | 1.625 |
| 3' 0" | 637.94 |
| 3' 6" | 34.625 |
| 4' 0" | 20.44 |
| 4' 6" | 13.00 |
| | 851.64 |
| <hr/> | |
| <u>Standard Gauge.</u> | |
| 4' 8½" Class A. | 463.875 |
| Other Standard Gauge | 197.375 |
| | 1512.890 |
| <hr/> <hr/> | |



APPENDIX D.

Relation of Speed to Axle Loads and Permanent Way.

I. Legislation and Practice.

(i) Light Lines constructed prior to 1868 were authorised in each case as Railways by special Act, and were mostly of the horse or steam tramway type. The Acts included no specific provisions relative to speed, axle load or permanent way. The Board of Trade, under the Regulation of Railways Act 1842, had to inspect the lines (if for passenger traffic) before they were opened, and prescribed regulations, including permissible speeds, having regard to the type of permanent way and axle load adopted. Each case was dealt with on its merits. Examples of these lines are Swansea and Mumbles Railway, Saundersfoot (1842) and Forcett Railway (1865).

(ii) The Regulation of Railways Act 1868 introduced direct legislation for the first time in respect of axle load and speed. Clause 28 of this Act authorised the construction and working of new lines, or the working of existing lines, as "light railways", provided that the speed at any time was limited to 25 miles per hour, and the greatest axle load on a pair of wheels to 8 tons. No provision relating to weight of rail, or type of permanent way, was included. The adequacy of these details of construction was left to the Board of Trade, who prescribed speeds and regulations accordingly. Examples of light railways constructed under this Act are:-

(a) Festiniog (1869). Gauge 1 ft. 11 $\frac{1}{2}$ ins. - the weight of rail first laid, 30 lbs. In present practice the maximum axle load weighs 6 tons, the weight of rail is 50 lbs., and the average booked speed is from 13 to 15 miles an hour, with a probable maximum of over 20 miles.

(b) Glyn Valley Tramway Act 1870. (Railway Act 1885). Gauge 2 ft. 4 $\frac{1}{2}$ ins. This line was first horse-drawn, and had a maximum speed of 8 miles an hour. It is now worked by steam, the ruling axle load being 10 tons, the weight of rail 50 lbs., and the booked average through speed is about 12 miles an hour, with a probable maximum of about 20.

(c) Plymouth, Devonport and South Western Railway. (1883) (Bere Alston & Callington). Gauge 4 ft. 8 $\frac{1}{2}$ ins. In accordance with present practice, the maximum axle load is 12 tons, the weight of rail 80 lbs., the booked average speed is about 17 miles an hour with a maximum of 25 miles an hour.

A few lines of light railway, rather than road tramway type, were also constructed during this period under the Tramways Act of 1870. Examples are:-

Wolverton and Stony Stratford Tramway (1883 & 1887). Gauge 3 ft. 6 ins. Speed was limited to 8 miles an hour, and 4 miles an hour through facing points. Rails subject to approval of Board of Trade. Flat bottomed rails 65 lbs. per yard were laid.

Vantage Tramway (Order 1876). Gauge 4 ft. 8 $\frac{1}{2}$ ins. Rails partly 46 lbs. and partly 66 lbs. per yard. Present maximum axle load 13 $\frac{1}{2}$ tons used for goods working, and 6 $\frac{1}{2}$ tons for passenger traffic. Speed of goods trains does not exceed 6 miles an hour.

Appendix D.

(iii) Subsequent to 1896, the bulk of what are termed Light Railways in Great Britain have been constructed under the Light Railways Acts of 1896 and 1912. In all Orders authorising these lines, excepting those of road tramway type, specific regulations have been laid down regarding axle load, weight of rail, and speed. These regulations are to be found either in the clause of the Order entitled, "Provisions as to working", or in the Schedule appended to the Order. The speed standard generally adopted for the 4 ft. 8½ ins. gauge was a maximum at any time of 25 miles per hour; further restrictions are generally included to meet sharp curvature of heavy gradients. Between 1896 and 1908, the prescribed minimum weights of axle load and rail for Light Railways of normal gauge were as follows:-

| Weight of single axle load. | Weight of rail per yard. |
|--------------------------------|-----------------------------|
| 12 tons | 56 lbs. |
| 14 tons | 60 lbs. |
| 16 tons | 70 lbs. |

On narrow gauge lines with smaller axle loads, lighter rails were prescribed, for example:

Welshpool and Llanfair (1899). Gauge 2 ft. 6 ins.- axle load 8 tons, rail weight 41½ lbs., speed 20 miles per hour.

Leek Railway (1898). 2 ft. 6 ins. gauge, 8 tons axle load 35 lb. rail, 15 miles an hour speed.

Nidd Valley (1901) Gauge 2 ft. 6 ins. (since increased to 4' 8½"), axle load 6 tons, rail weight 35 lbs. speed 25 miles per hour.

Campbeltown and Machrihanish (1905) Gauge 2 ft. 3 ins. axle load 8 to 10 tons, weight of rail 40 to 50 lbs. speed 20 miles an hour.

Present practice on the above narrow gauge lines is as follows:

Welshpool and Llanfair. Weight of rail 45 lbs. average booked speed 10 miles per hour, maximum 15.

Nidd Valley. Gauge increased to 4 ft. 8½ ins. axle load 9 tons, rail 56 lbs. booked through speeds (including stops) of 14.4 miles per hour on up gradients and 18 miles per hour down; the maximum speed probably exceeds 25 miles per hour.

Campbeltown and Machrihanish. Weight of rails 50 lbs. booked through speed (including stops) 12 miles per hour, maximum probably 20.

It was found that out of 24 light lines of normal gauge, constructed up to 1908, 21 adopted a heavier rail than that prescribed in the Order. In most of these cases the heavier rail selected was second-hand, and probably more economical to purchase than new rails of the lighter weight prescribed. But in some cases where a lighter rail was first laid, it was found to be inadequate for main line engines with axle loads of the prescribed weight, and also to be uneconomical from the point of view of maintenance. At the instance of the Inspecting Officers, relative standards were therefore increased in 1908 to the following figures, which are still in force:-

| Axle Loads. | Weight of Rails. |
|-------------|------------------|
| 12 tons | 58 lbs. |
| 14 tons | 64 lbs. |
| 15 tons | 67 lbs. |
| 16 tons | 70 lbs. |

Examples of axle loads, weight of rails as prescribed, and as laid on light railways of normal gauge, are as follows:-

| | <u>Axle Load.</u> | <u>Prescribed Weight.</u> | <u>Weight of rail laid.</u> |
|---|-------------------|---------------------------|--|
| Tanat Valley | 14 tons. | 60 lbs. | 63 lbs. |
| Basingstoke & Alton, (L. & S.W.R.) | 14 " | 60 " | 75 to 82 lbs. (part worn). |
| Bere Alston & Calstock Kent & E. Sussex. | 14 " | 60 " | 80 (part worn) |
| Lauder (N.B. Railway) Burry Port & Gwend- drecht. | 12 " | 56 " | 60 (re-laid with 80 lbs. part worn) |
| Shropshire & Mont- gomeryshire. | 14 " | 64 " | 65 lbs. |
| | 12 " | 58 " | 65 lbs. (for all tons axle). |
| | | | 75 lbs. |
| | | | 70 lbs. (part worn) (for 10 ton axle) |

II. Practice in other countries.

(i) Belgium.

The gauge is almost universally metre (3 ft. 3½ ins.). Speed is restricted to that which will permit of a train being stopped by engine brake alone within 30 metres (about 40 yards), even on the steepest gradient (1 in 33 but generally 1 in 40). It must never in any case exceed 18.6 miles per hour in open country, or 6.2 miles per hour in towns or villages. The average journey speed never exceeds 12 miles per hour and is generally less.

Rails are of the flat-bottom type, 46 lbs. per yard. The engines used are all of one type, 6-coupled, and weight 27½ tons, single axle load may be taken, therefore, at about 9 tons. They have driving wheels 3 ft. 11½ ins. diameter, and are not capable of attaining any considerable speed.

(ii) France.

Local lines are mostly metre gauge, and rails vary from 40 to 50 lbs. per yard. Speed seldom exceeds 18 miles per hour. Specific examples are:-

Dijon-Merebeau. Rail 50 lbs. Speed limit 20 kilometres (12½ miles), axle load 7 tons.

Beaune-Semur. 48-lb. rails axle load 9 tons, speed 10 to 15 kilometres an hour (6½ to 9½ miles).

Amiens-Beauchamps. 44-lb. rails, speed 45 kilometres (28 miles) axle load 6.8 tons.

(iii) Germany.

Mugeln to Geising-Altenburg. Gauge 2 ft. 5½ ins., rails 51 lbs., weight of engines 25 tons, speed limit 25 kilometres (15½ miles).

Landsberg-Schongau. Gauge 4 ft. 8½ ins. rails 48 lbs. per yard, axle load 10 tons.

(iv) India.

There is no difference in the minimum prescribed weight of rail for ordinary or Light Railways. On metre and 2 ft. 6 ins. gauge lines, the rule generally adopted for calculating the minimum weight of rail is 5 lbs. per ton of maximum axle loading up to a weight of rail of 60 lbs., for 12 ton axle. Above 60 lbs. for all gauges, the minimum acceptable weights of rail per maximum axle loading, are as follows:-

Appendix D.

| | |
|--------------|-------------------|
| 12 tons | 60 lbs. per yard. |
| 13½ " | 65 " " " |
| 15-1/10 | 70 " " " |
| 17 " | 75 " " " |

Experience has shown that the rule quoted for calculating the weight of a rail below 60 lbs. per yard, generally gives too light a rail, both as regards strength and stiffness, but in view of the lower speeds at which trains are normally worked on such narrow gauge lines, the rule has been retained.

With sleepers placed closer together than 3 ft. 6 ins. a less weight of rail per yard is permissible in India.

III. Weight of rail as influenced by sleeper spacing and other conditions.

The suspended rail joint, even with sleepers butted against the fishplates, is generally weaker than the rest of the rail with sleepers laid at the usual interval. The track, therefore, as a whole, will not be strengthened by providing additional sleepers, unless the joint is also strengthened. Even in cases where the rail joint is stronger than the rest of the rail, it is thought that it will not generally be found economical to lay a new line with rails so light that the sleepers must be spaced closer together than about 33 ins. On the other hand, it may prove economical on an existing light track, to insert additional sleepers instead of renewing the rails, provided that the rail joint is sufficiently strong.

Curvature is another factor in considering the weight of rail. On light lines, the percentage, as well as the degree, of curvature, is generally higher than on ordinary railways, especially if economy in first cost is aimed at; and it is thought that it will be found eventually to prove uneconomical to reduce the weight of the rail, especially in the case of flat-bottom rails, to the bare strength and stiffness required. Experience has proved that the cost of maintenance is reduced, and the life of the track very considerably prolonged, when the metal in the rail provides some margin over minimum requirements. This will be more particularly the case when, as is common on light lines, the road bed is of less substantial character. The practice in Ireland, for example, on 3 ft. lines, is nowadays to provide a 60 lb. rail for 10 ton axle loads, and speeds up to 25 miles an hour, instead of the 50 lb. rail which it was previously the practice to provide.

IV. In addition to axle load and speed, the weight of rail can therefore be rightly determined, as regards sufficiency and economy, only by taking into account a number of other considerations. Some of these have been mentioned, i.e. percentage and degree of curvature in alignment, character of road bed, and spacing of sleepers, having regard to the strength of rail joint. These bear directly upon first cost of construction, and influence the determination of the desirable weight of rail. The availability of part-worn rails of suitable type representing economy in cost, may render a rail of heavier weight than actually necessary, acceptable. The effect of an unduly light type of rail, apart from the question of its strength, on the cost of maintenance; and the desirable eventual life, having regard to the prospects of traffic, have also to be considered.

To prescribe definite weights for maximum axle

loading and rails, in relation only to maximum speed, does not appear to be commendable, if due regard is to be paid to all governing conditions. It is, moreover, considered that advantage will be gained by specifying as typical for adoption the British Standard Sections of rail. These vary in weight by multiples of 5 lbs. between 20 lbs. and 100 lbs. per yard. Some latitude will thereby be provided, having regard to particular conditions in each case, in the selection of the rail sufficient to carry the maximum axle loading proposed.

V. It is therefore suggested that the attached sliding scale should be inserted in Appendix VII to the Requirements with regard to the Opening of Railways, and that promoters should select from this sliding scale the weight of rail proposed in each case.

| Weight of Rail in lbs. | | Maximum axle-loading in tons. |
|---------------------------|-----|----------------------------------|
| 30 | ... | 4 to 6 |
| 35 | ... | 5 to 7 |
| 40 | ... | 6 to 8 |
| 45 | ... | 7 to 9 |
| 50 | ... | 8 to 10 |
| 55 | ... | 9 to 11 |
| 60 | ... | 11 to 13 |
| 65 | ... | 13 to 15 |
| 70 | ... | 15 to 17 |

In this connection it is considered that for Light Railways working to an authorised maximum speed of 15 miles per hour, a lighter section of rail may be utilised, other conditions (including axle load) being similar, than on a Light Railway working to an authorised maximum speed of 25 miles an hour.

VI. With regard to the considerations which would guide the appropriate Government Department in deciding whether any particular line should or should not be treated as a "Light Railway", it is suggested that maximum speeds would be found to constitute one of the most important governing factors and that - in so far as this particular factor is concerned - light railways should be classified in two groups as follows:-

- i. Lines having an authorised maximum speed of 25 miles per hour.
and
- ii. Lines having an authorised maximum speed of 15 miles per hour.

Whstever the general tenor of future legislation may be, the extent of the technical advantages which may safely be conferred upon light railways will necessarily be determined - in part at least - by the limitations of speed which these undertakings are willing to accept; and the suggested classification would admit of elasticity of treatment and ensure that undertakings desiring to obtain the fullest measure of advantage might do so by adopting the speed limits specified for lines in Class II.

The question of speed, however, is intimately bound up with that of axle-load and weight of rail, and in settling the precise weight of rail to be used in any particular case (vide the sliding scale suggested in paragraph V above) the authorised maximum speed proposed

Appendix D.

would have to be taken into account. The question of speed does not, however, depend solely upon explosive or type of permanent way. Security at level crossings, and adequacy of fencing, signalling and working arrangements must also be taken into account. It is clear that economy in construction and maintenance of Light Railways cannot be secured by an increase of speed.

APPENDIX E.

APPENDIX E.

EXTRACTS FROM THE REVISED REQUIREMENTS
WITH REGARD TO THE OPENING OF RAILWAYS.

Section A, setting forth the documents to be sent to the Ministry of Transport.

This Section has been revised in detail only, and the present requirements for standard gauge lines, therefore, stand.

Section B. - Requirements.

The following is the draft of the Note at the head of the Requirements:-

"NOTE. - The following requirements apply to the construction or reconstruction of, and alterations or additions to all statutory railways. It will be seen that references are made in the text to the possibility of relaxation to meet individual cases. It should also be noted that, in order to secure economy, with due regard to safety, when no references to relaxation are made, these requirements may be modified at the discretion of the Minister of Transport, having regard to such special circumstances as may be submitted for consideration in each case. Standardisation of practice is also desired. With these ends in view, it will, therefore, be desirable to submit, whenever practicable, plans of works, for which approval is required, before they are commenced. Attention is drawn to paragraph 35 and Appendix VII, which deal with the applicability of these requirements to light railways and lines of local interest."

Paras. 2 to 5. - Signals.

The following will apply to new Light Railways:-

"Front lights for all signals to be red for Danger, yellow for Caution (including the normal position of distant signals), and green for Clear. White to be used only for the back lights of signals."

Para. 35. - Light Railways.

"In respect of Light Railways, or Lines of Local Interest, each case will be considered as regards the applicability of the foregoing requirements, on merits; having in view the gauge, volume of traffic, axle loads, and speed limits. A general outline of some of the relevant variations and relaxations is given in Appendix VII."

VARIATIONS FROM AND RELATIONS OF THE REQUIREMENTS IN THE CASE OF LIGHT RAILWAYS OR LINES OF LOCAL INTEREST.

Section A is applicable as necessary.

Section B. - Para. 1. Block Telegraph. - An acceptable apparatus, where such is necessary at all, for providing an adequate interval of space between following trains, will be some form of telephone instrument.

Paras. 2 to 5. Signals. - Home and starting signals only for each direction at stations on single lines which are staff or electric token posts will be necessary. Distant signals will not be necessary unless stop signals cannot be seen for a distance of a quarter of a mile. Distant signals in such circumstances may be of the unworked type.

Para. 6. Points. - An economical type of facing point lock, that is, one which enables the points, bolt lock, and locking bar (when used) to be worked by one lever, is recommended. A locking bar will not be required when the lever working the facing points is alongside them. Rodding for the mechanical operation of points may not be necessary.

Paras. 7 and 8. Signal-boxes and Interlocking. - A ground frame, which need not have overhead cover, is acceptable in lieu of a signal-box.

Para. 9. Safety Points. - Worked scotches or derailers may be used instead of safety points, where protection is necessary.

Paras. 11 and 12. Stations. - Platforms need not, unless traffic necessitates, be of greater width than six feet. If the carriages are of the tramway type, or have adequate steps attached to enable passengers to descend and ascend from the ground, raised platforms are not necessary.

Para. 16. Gradients. - This requirement is in general not applicable, but provision may be necessary to avert danger resulting from vehicles running back, owing to the existence of steep gradients at stations or intermediate sidings.

Para. 17. Turntables. - Not as a rule applicable.

Paras. 18 to 21. Bridges and Viaducts. - Light standards of live loads are given in Appendix II. The allowance for Impact effect, as given in Appendix IV, is also not applicable.

Paras. 22 and 23. Permanent-way. - Not applicable in regard to weights and dimensions.

Para. 24. Check Rails. - Minimum radius may be taken as eight chains for the standard gauge.

Para. 28. Level Crossings. - The arrangements are for consideration in each individual case.

A P P E N D I X F.

(1) Description of Standard of Rolling Stock.
 (2) Question of increasing Dimensions of Groove in Tramway Tracks over which Light Railway Rolling Stock may have to pass.

(1) In the great majority of cases the rolling stock employed by light railway undertakings in the United Kingdom is wholly owned by the undertakings themselves. In one or two instances it is provided entirely by the neighbouring main line company, as in the case of the Forcett Railway which is closely associated with the North Eastern Railway Company, and in the case of the Kelvedon, Tiptree and Tollesbury Railway which is worked as a part of the Great Eastern system. In a few instances the whole or part of the rolling stock is hired from the neighbouring main line Company, whilst on a few lines laid in industrial areas a part of the stock is the property of local colliery and quarry companies: and in at least one instance (in Ireland) the stock is owned by the County Council interested.

(2) Except in the case of certain lines which partake of the nature of "tramways" the motive power employed is steam. The use of electricity or petrol has yet to come.

(3) A number of lines are worked with only one engine in steam at one time, but on the great majority of lines the number in steam varies from two to four, whilst on some of the longer systems in Ireland and on one or two industrial lines in England it is naturally much larger. For example, the Burry Port and Gwendreath Valley Railway has 11 or 12 engines in steam whilst the lines operated by the County Donegal Railway's Joint Committee have as many as 15 locomotives in steam.

The types of locomotive used vary considerably. A proportion of tender engines are employed, but in the majority of cases side-tank or saddle-tank locos are provided and are constructed to run with either end first. On a few lines the locos are turned at terminals but this is not the general rule.

The weights of the engines vary widely with the type and gauge. The maximum axle-load permissible on standard gauge light railways in Great Britain ranges usually between 8 and 14 tons and on the narrow gauge lines from 4 to 6 tons; but on the narrow gauge systems in Ireland the range is rather wider and runs, in some cases, up to 11 and 12 tons.

(4) The brakes used on coaching stock are usually of the vacuum type; in a few cases steam, and even handbrakes only, are employed. On a freight stock hand-brakes are most commonly provided; but on a number of lines vacuum, or vacuum and hand-brakes are installed. The passenger coaching stock consists mainly of vehicles of uniform class, usually first and third class but in some instances third class only; and a considerable proportion of composite (first and third class) coaches are also employed. As a general rule the coaches are of the ordinary design, but here and there they are of the "tram-car" type with an entrance at either end, or at the sides and ends. The proportion of first class to third class accommodation varies very widely, but appears on the whole to be rather liberal. In a few instances the proportion is about as 1 : 4.

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(5) Apart from the coaching stock the bulk of the vehicles in use are open wagons, with a somewhat smaller proportion of covered wagons. A considerable number of rail and timber wagons, cattle trucks and horse boxes are employed, the proportion of vehicles for the carriage of live stock being naturally high in some of the agricultural areas, particularly in Ireland. Many of the lines possess ballast wagons and in some instances travelling cranes and tool vans form part of the equipment.

(6) For the lighting of the coaches gas is used to a somewhat greater extent than oil, but the latter is still widely employed. Where gas is used there is a decided preference shown for acetylene lamps. As a rule only one illuminant is used on each line, but in some cases both oil and acetylene gas are used. On the Derwent Valley Railway electricity is employed, the current being generated by a dynamo on the brake coach; but this appears to be an isolated case.

(7) On about half of the light railways no provision is made for the heating of passenger coaches, and where such provision is made the apparatus is usually limited to foot-warmers. Steam heating apparatus is occasionally provided, but this is rather the exception than the rule.

(8) It has frequently been suggested that ordinary "tramways" might be more widely used for the carriage of goods and that in this connection added advantage would be gained if the construction of tramway tracks were such as to admit of mechanically-hauled railway rolling stock passing freely over them. In the consideration of the matter various difficulties have presented themselves, and amongst these the fact that the groove in the ordinary tramway rail is not sufficiently wide or deep to allow of the free passage of the wheel flanges of railway vehicles. In certain cases a gauge of 4' 7 $\frac{3}{4}$ " has been selected for tramway systems, e.g. in Glasgow, Paisley, Greenock and other places in Scotland, whilst a similar gauge has been adopted in England at Huddersfield, Gosport and Fareham - the reason being that with a 4' 7 $\frac{3}{4}$ " gauge the position of the groove is better situated for the movement of railway tyred stock than that of the 4' 8 $\frac{1}{2}$ " gauge; but the difficulty with regard to the dimensions of the groove still remains. The standard width of the groove for new tramway tracks was fixed at 1-1/8 inches for straight sections and at 1 $\frac{1}{4}$ inches on curves and these dimensions would have to be increased in order to admit of the free passage of railway stock. The standard dimensions of the groove have been fixed with due regard to public opinion concerning the safety of certain wheeled traffic, and it is possible that such a wider and deeper groove might raise opposition at the outset from a certain section of the public in the case of tramways laid on public roads. Outside Great Britain, however, it is usual for railway stock to be run over tracks laid on public roads and streets. Objections of the kind which have been raised in this country have not been sustained abroad and in consequence, there has been a definite gain in the matter of transport facilities, whilst the public concerned have apparently learned to appreciate the benefits accruing from the freer use of railway rolling stock.

APPENDIX G.

Light Railways in the United Kingdom.

Standard of Maintenance.

(1) The Standard of Maintenance on those Light Railways which are owned or worked by Main Line companies is high. It approximates, indeed, to that of the Secondary (or Branch) Lines of these companies. It is certainly higher than that on similar Light Railways which are privately owned; and this applies not only to light lines of standard gauge but also - and more particularly - to light railways constructed to narrow gauges.

(2) Broadly speaking it may be said that on the privately owned narrow gauge railways, although the present day cost of maintenance is high, the actual standard of maintenance attained is low. The evidence of this is to be seen in worn-out rails, sleepers and rolling stock and in the dilapidation of other property, representing the accumulation of years of arrears. As a natural result of these arrears the present day cost of upkeep is still further enhanced. In these circumstances figures shewing the expenditure which is now being incurred on maintenance furnish but little indication of the facts, and the actual condition of the lines in question can be ascertained and appreciated only by inspection. In some cases the traffic is only maintained with difficulty.

(3) On the privately-owned Light Railways of 4' 8½" gauge the standard of maintenance is, in most cases, higher than on narrow gauge lines similarly owned. In the majority of cases the traffic on the former is heavier and more constant, and this has not only necessitated a higher standard of upkeep but has also, at the same time, rendered it practicable.

(4) In view of the facts cited above it will be obvious that there is no general standard of maintenance to which all Light Railways in the United Kingdom may be said to conform, but the following figures, which shew the cost of maintenance per £ earned in respect of a number of typical light lines, are of interest. They are based upon the total traffic receipts per mile open in 1919.

Narrow Gauge Railways.

Pence.

| | | |
|-----------------------|--------------------------------|-------|
| Festiniog | (1' 11½") | 57.31 |
| Lynton and Barnstaple | (1' 11½") | 61.96 |
| North Wales N.G. | (1' 11½") Freight traffic only | 24.23 |
| Glyn Valley | { 2' 4½" | 17.53 |
| Southwold | { 3' 0" | 47.06 |

Standard Gauge Railways.

| | |
|---------------------------------------|--------|
| Burry Port & Gwendreath Valley | 73.07 |
| Cleobury Mortimer and Ditton Priors | 113.01 |
| Derwent Valley | 56.19 |
| Forcett (N.E.R.) Freight Traffic only | 31.14 |
| Knott End | 20.46 |
| Mid Suffolk | 134.28 |

It may be taken that, in the case of the Glyn Valley Railway and other cases in which the foregoing figures of maintenance cost are very low, there are special reasons for the fact.

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(5) The physical features of the districts served will account, in some measure, for the wide variations in the cost of maintenance. One railway, for example, has sharp curves, heavy rock cuttings and embankments and has at the same time a heavy holiday season passenger traffic, which renders it necessary that the standard of upkeep should be well maintained. On a certain other line there are no heavy gradients, a considerable portion of the mileage is unfenced and the standard of maintenance is known to be poor. A comparison of the actual expenditure on maintenance in cases such as these naturally reveals a wide disparity.

(6) Variations of maintenance costs such as are exhibited by the figures given in paragraph 4 cannot, however, be explained by reference merely to the physical features of the districts served or to the nature of the traffic on the lines concerned. The differences in the cost of maintenance on railways of similar gauge are such as to emphasize the necessity for investigation "on the ground". Without such investigation it is not possible to explain the variations fully or to determine accurately whether the heavy charges incurred in certain cases are justified or to express any conclusive opinion as to the standard of maintenance on Light Railways generally.

Standard of Operation.

(7) Item 7 of the Terms of Reference reads as follows:-

"Standard of operation, with special reference to the absence of restrictions normally in force in the United Kingdom."

This part of the Reference would appear to have been framed with particular regard to information concerning Continental methods; but it is worth recording that, in the replies received to the Questionnaires issued to Light Railway undertakings in England, several companies deal with the question of restrictions normally in force in this country—especially those imposed by the Regulation of Railways Act 1868 respecting speed and axle-leads. It would appear that, in some instances, a higher standard of operation could be maintained if these particular restrictions were relaxed to meet present day requirements, especially on light railways of standard gauge; but these cases are isolated.

(8) In the absence of serious complaints from traders the standard of operation on Light Railways of 4' 8½" and narrower gauges which are owned or worked by Main Line companies may be considered satisfactory and to be equivalent to that of the Secondary (or Branch) Lines of these companies.

(9) As a general rule the standard of operation on privately-owned railways is not up to the pre-war standard. This decline is mainly due to the introduction of the 8-hour day and to the obligations imposed upon the companies with regard to increased rates of pay. In order to meet the conditions thus created measures of economy have become imperative, and for this reason late and early services have been withdrawn, with the result that traffic has passed from the railways on to the roads.

(10) The Light Railway companies which have been approached—including even those which are not under Government control—

comment strongly upon the fact that labour questions and wages have been settled without consultation with or representation of the light railway undertakings, and they state that in some cases this has had ludicrous results. There is no doubt that the recent revision of the conditions of service of railwaymen has made it necessary in every case to curtail expenditure and has thereby greatly reduced the efficiency of the light railways concerned. This aspect of the matter is dealt with more fully, however, in the separate memorandum relating to Wages, Hours and Conditions of Labour - see Appendix H

(11) The standard of operation on some of the independent light railways is further impaired through the lack of siding accommodation at stations and at exchange points as well as by a shortage of locomotive power and other working facilities. One railway has practically reached the limit of its working effort and it is said to be doubtful whether the resources of the district concerned are effectively developed by the railway service now afforded. Certainly, no further development is practicable under present conditions. On two days of the week no passenger service at all is given. These days are devoted to clearing up arrears of heavy freight traffic, the Company being unable, with their limited locomotive power, to maintain both freight and passenger services daily. A more hearty co-operation on the part of the main line companies with whose lines the light railways make connection would materially assist in many cases and would lead to improved traffic results.

(12) Amongst other interesting facts elicited by the questionnaire addressed to light railway companies in the United Kingdom, the following may perhaps be cited as they have a bearing upon the question of operation:-

(a) The Companies are not unanimous as to the usefulness of "through" rates for freight. No doubt the legislative proposals embodied in the new Railways Bill will remove some of the difficulties in regard to the operation of through rates. In addition, the up-to date Trader will not be prepared to pay for four terminals in the future. as he appears to have done in many cases in the past. The question of rates and charges is dealt with, however, in Appendix J.

(b) Almost all the Companies are affected by the competition of road motor services, in regard to both freight and passenger traffic - see Section 4 of the Committee's Report.

(c) A number of light railways, particularly in Ireland, are labouring under difficulties arising from the fact that they were too cheaply constructed and have consequently proved costly to operate.

(13) Amongst other points emphasized in the replies to the questionnaire is the need for

(a) Greater and cheaper facilities for the acquisition of land.

(b) A simplification and standardisation of station buildings.

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(c) A standardised lay-out for junctions and yards.

(d) The reduction and standardisation of clerical work.

These matters however will be more fully discussed in separate memoranda.

(14) The operating costs incurred by light railway undertakings are heavy. This is revealed by the following figures respecting a number of typical undertakings. The figures show the expenditure incurred per £ earned, the calculations being based on the total traffic receipts per mile open in 1919:-

| | <u>Narrow Gauge Railways.</u> | <u>Pence.</u> |
|---------------------------------------|---|---------------|
| Ffestiniog | (1' 11 $\frac{1}{2}$ ")..... | 153.86 |
| Lynton & Barnstaple | (1' 11 $\frac{1}{2}$ ") | 86.91 |
| North Wales N.G. | (1' 11 $\frac{1}{2}$ ") Freight traffic only | 123.46 |
| Glyn Valley | (2' 4 $\frac{1}{2}$ ") | 100.52 |
| Southwold | (3' 0") | 81.62 |
| | <u>Standard Gauge Railways.</u> | <u>Pence.</u> |
| Burry Port & Gwendreath Valley | | 185.55 |
| Cleobury Mortimer & Ditton Priors | | 126.35 |
| Derwent Valley | | 81.90 |
| Forcett (N.E.R.) Freight Traffic only | | 62.28 |
| Knott End | | 62.00 |
| Mid Suffolk | | 211.44 |

(15) It is difficult, however, without actual experience of the working of individual railways to express a definite opinion as to the soundness, or otherwise, of the system of operation in each case or to say whether a more economical standard of operation could be established. It is suggested that in some cases the best use is not made of the undertakings and that, as a consequence, revenue suffers. It may well be, however, that in individual cases there are local circumstances which preclude improvement. In one instance in which the advice of the Ministry of Transport has been sought with regard to methods of operation it has been found possible to suggest valuable economies, and there is reason to think that similar assistance would be welcomed in other cases also.

Appendix G.

Schedule of Representative Train Services in
Typical Localities.

Particulars of "hooked" services worked under various conditions and in typical areas, are set forth in the Schedule below.

Standard Gauge Railways.

| District | Name of Company | Nature of Traffic catered for | Number of Trains in each direction. (Week days only) | |
|---------------|--------------------|-------------------------------|--|-------|
| | | | Passenger | Mixed |
| Northern | Knott End | Industrial | 5 | |
| North Eastern | Dorwent Valley | Agricultural | 3 (Mon. to Friday) 4 up and 5 down (on Sat. only.) | |
| Southern | Kent & East Sussex | Industrial & Agricultural | 5 (Monday to Friday) 4 (only on Saturdays) | |
| Eastern | Mid Suffolk | Agricultural | 3 (also 1 train on Sundays) | |

Narrow Gauge Railways.

| District | Name of Company | Nature of Traffic catered for | Number of Trains in each direction. (Week days only) | |
|---------------|-----------------------|-------------------------------|---|---|
| | | | Passenger | Mixed |
| North Wales | Ffestiniog | Industrial | | 5 |
| Western | Lynton and Barnstaple | Holiday and Agricultural | | 4 |
| North Western | Glyn Valley | Industrial | | 4 (1 additional on Wednesdays and Saturdays) |
| Eastern | Southwold | Agricultural & Coast Line | 4 | |

These passenger services would appear to be adequate. Freight Services are arranged to meet traffic requirements, and can not therefore be criticised in a report of this nature.

APPENDIX H.

Light Railways in the United Kingdom.

General Organisation and Management - Wages,
Hours and Conditions of Labour.

(1). The general organisation and management of Light railways in the United Kingdom vary considerably in form and character and the variations are so wide and numerous that no concise classification or grouping of these lines with particular reference to the system of organisation and management adopted in each case is practicable. The differences of system, where these are widest, appear to be determined usually by the relative magnitude of the undertakings and by the nature and volume of the traffic with which they have to deal. In certain cases, also, light railways are closely associated with main line companies and, in some instances, with Local Authorities whilst certain others are "grouped" for purposes of management; and in each of these cases the organisation adopted differs, naturally, from that of a light railway company which is independently managed and has no connection with any other undertaking or authority.

(2). With regard to those light railways which either form part of or are closely associated with main line companies the following lines may be cited as examples:

1. Kelvedon, Tiptree and Tollesbury
2. Wolverton and Stony Stratford.
3. Lampeter Aberayron and New Quay.
4. Aveline Joint.
5. County Donegal Railways.
6. The lines in Ireland worked by the Midland Railway (Northern Counties Committee).

(3). The Kelvedon, Tiptree and Tollesbury line is owned and worked by the Great Eastern Railway Company as an integral part of their system. It is, in effect, a branch of the main line. The working of the light railway is supervised by the Stationmaster at Kelvedon who controls the staff employed and is responsible to his Divisional Superintendent of Operation. The rolling stock is owned by the Great Eastern Company and heavy repairs are dealt with in their main repairing shops, whilst certain running repairs are executed at Kelvedon. The light railway, like the owning company, is a "controlled" undertaking, and the wages paid and the hours of labour in force are the same as on the main line.

(4). The Wolverton and Stony Stratford line, though described officially as a "Tramway", is the property of the London and North Western Company and is worked as a part of their system, of which it is in effect a branch line. The wages and hours of labour are the same as on the Company's main system.

(5). The Lampeter Aberayron and New Quay Light Railway is worked by the Great Western Company, by whom also the rolling stock is owned and repairs are executed, the smaller company having no workshops of their own. In the working of the line the Great Western Company follow, generally, their own practice, and the wages and hours of labour are similar to those on the main line.

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(6). The Arkholme Joint Railway is owned by two main line companies (the North Eastern and the Lancashire and Yorkshire) in equal shares and is administered on their behalf by a joint Committee of Directors. The officers of this Committee are a Secretary and a "Joint Superintendent", the latter being responsible to a committee of the traffic officers of the two owning companies. The engineering work is carried out by the North Eastern Company at the cost of the "joint" companies. The legal, estate and rating work is apportioned between the two owning companies and the costs thus incurred are debited against the "joint" undertaking. Revenue receipts and expenditure are dealt with direct by the owning companies, whilst capital expenditure is dealt with through a joint account kept by the Secretary of the "joint" concern. The rolling stock is hired from the Lancashire and Yorkshire Company. Structural maintenance is dealt with by the North Eastern Company's staff. The train staff is hired at inclusive hourly rates from the Lancashire and Yorkshire Company.

With regard to wages, "Lancashire and Yorkshire" conditions apply to the traffic staff and the "North Eastern" standard to Platelayers and Gatewomen.

(7). The County Donegal Railways are owned by the Great Northern Railway Company (Ireland) and by the Midland Railway Company of England, but they are independently worked under the control of a joint committee composed of representatives of each of the owning companies who meet regularly at Belfast for the transaction of business. The Chief Executive Officer is the Traffic Manager, who also acts as Secretary and is responsible to the Committee for the working of the system. The responsibility for the maintenance of the permanent way, etc. and rolling stock rests with an Engineer, who acts also as Locomotive Superintendent. The rolling stock is owned by the joint Committee who possess workshops suitably equipped for all repairs and maintenance including even heavy repairs. The accounting work is in the charge of an Accountant.

The wages and hours of labour are the same as on the connecting main line.

(8). The Irish light railways included under the management of the Northern Counties Committee are worked as a part of the Midland Railway Company's undertaking, the committee of six Directors being appointed by the Board of that Company. The executive work is apportioned between separate Departments viz: Locomotive Department, Carriage and Wagon Department, Permanent Way Department, Traffic Department, and a Secretarial and Accounting Department. The rolling stock is owned by the Company, which has workshops at Larne for the repair of the stock. With the exception of boiler work and of certain carriage repairs which are carried out in the Company's main workshops at Belfast, all heavy and light repairs are executed at Larne. New locomotives are built in the main shop at Belfast.

With regard to wages and hours of labour, the locomotive train men are paid at main line rates whilst the locomotive shop staff are paid at "district" rates. The staff of the Traffic and Engineering Departments are paid at the standard "class" rates as on main lines; and the conditions of service generally are in accord with main line practice.

(9) Apart from undertakings such as the six referred to above there are certain light railways which, though otherwise independent, have entered into arrangements with neighbouring main line companies in respect of working or of the provision and repair of rolling stock. By way of example the cases of the following railways may be quoted:-

1. Forcett.
2. Derwent Valley.
3. Cleobury Mortimer and Ditton Priors.
4. Mid-Suffolk.
5. Southwold.

(10) The traffic on the Forcett Railway is worked by the North Eastern Railway Company, by arrangement. The latter Company own the greater part of the rolling stock and provide and work all the locomotives. They also provide the train staff.

(11) The Derwent Valley Railway has no workshops of its own, and the execution of all carriage and wagon repairs which are beyond the capacity of the Company's "Handyman" are entrusted to the North Eastern Railway. The latter also provides the two drivers and two firemen employed on the light railway.

The hours of labour on this line are 48 per week and the wages in the latter half of the year 1920 were as follows:-

| | |
|----------------|--------------|
| Head Ganger | 66/- |
| 2nd ditto | 60/- |
| P.W. Men | 58/- |
| Head Guard | 62/- |
| 2nd ditto | 58/- |
| Porters | 57/- to 60/- |
| Stationmasters | 78/- |

(12) The Cleobury Mortimer and Ditton Priors Light Railway owns its rolling stock but possesses no workshops, the locomotives and coaches being repaired by the Great Western Company.

The wages and hours of labour on this light railway are the same as on the neighbouring main line.

(13) The Mid-Suffolk and Southwold undertakings own their rolling stock. In the case of the former, running-shed and other minor repairs are dealt with by the company in a small local shop, but all heavy repairs are executed by the Great Eastern Company. In the case of the Southwold line all heavy repairs are entrusted either to outside firms or to the Great Eastern Company.

The wages and hours of labour on both of these light railways are the same as on the neighbouring (Great Eastern) main line.

(14) Apart from light railways such as the five undertakings mentioned above there are certain others which, although they own all their rolling stock and have workshops capable of dealing with the bulk of the necessary repairs, find it convenient to have such work as wheel turning, wheel tiring, castings or spring repairs carried out in main line shops.

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(15) Cases in which Local Authorities are concerned in the organisation and management of light railways are less numerous in Great Britain than in Ireland, but the case of one such undertaking in England deserves mention - namely that of the Nidd Valley Railway which is under the authority and control of the Waterworks Committee of the Corporation of Bradford. The Waterworks Engineer acts as Manager and Engineer, the Town Clerk as Secretary and the City Treasury as Treasurer to the railway undertaking. The train, station and maintenance staff - including one Stationmaster who acts as Superintendent of the Line - number 14. The rolling stock is owned by the Corporation and there is a small workshop provided for minor repairs, but heavy repairs are entrusted to engine building firms.

The wages and hours of labour in force on this railway conform to main line standards.

(16) In Ireland cases in which the responsibility for the working of light railways rests with County Councils are not uncommon. For example, the Timoleague and Courtmacsherry Extension and Ballinascarthy and Timoleague Junction Railway is worked by a Committee of Management on behalf of the Cork County Council. The General Manager and Engineer are part-time officers; and the train, station and maintenance staff number 24. The rolling stock is owned by the County Council and there is a small shop for running repairs.

The wages and hours of labour are similar in all respects to those in force on the neighbouring main line.

(17) The Tralee and Dingle Railway, to quote a similar case, is worked by a Committee of Management appointed annually by the Kerry County Council. The Committee deal with all questions submitted to them for their consideration by the various Departments or by the General Manager or Secretary.

The rolling stock is owned by the undertaking which possesses workshops capable of producing new wagons and carriages and of executing heavy and light repairs to all the rolling stock including the locomotives.

The wages and hours of labour on this railway conform strictly to main line standards.

(18) For general purposes of administration and management certain light railways in England and Wales are "grouped" - about 100 miles of standard gauge and 3 miles of narrow gauge line being included in one group.

Amongst the light railways thus managed are the East Kent, the Kent and East Sussex, the Hundred of Manhood and Selsey, the Shropshire and Montgomeryshire and the Weston, Clevedon and Portishead Railways. On each of these lines, except the Hundred of Manhood and Selsey Railway, the Secretarial, Accounting and Rate-fixing work is "farmed out" privately for a small annual payment. On the Selsey Railway the Manager acts as Secretary, but when he retires a less highly paid Officer will be appointed as "Clerk in Charge", and the Secretarial work will then be "farmed out" for a payment of £25 a year. It is in respect of the managerial and professional services, however, that the economy of personnel effected by the "grouping" system is mainly realised.

For the whole of the group to which the railways named above belong the salaries paid for these services do not exceed £1,500 per annum, of which £800 is assigned to general management and £350 each to the duties of the Engineering and Locomotive Superintendents. It would appear that the system of "grouping" has in this particular case resulted in economy, and it is claimed that its adoption has also resulted in the provision of better facilities for the public.

(19) It should be added that the rolling stock employed on these "grouped" lines is in all cases owned by the undertakings concerned and that each possesses workshops at which all the necessary repairs can be executed, with the exception of such work as wheel turning, wheel tyreing and castings. This is usually entrusted to main line companies or to outside engineering firms.

(20) The question whether the principle of "grouping", as applied to light railways, could be further extended appears to have received a good deal of consideration by those having practical experience of the working of such undertakings. It seems to be generally agreed that the extension of the system would lead to economy; but it has been pointed out at the same time that the prospects of such economy would be diminished if compensation for loss of office had to be paid to the officials whose posts might be abolished in the process of grouping. The nett receipts of the various lines concerned being usually very small, the payment of reasonable compensation would in itself impose a heavy burden upon the undertakings. It has been urged, on the other hand, that on the occurrence of vacancies individual light railways might, by arrangement, secure inclusion in an existing group and so effect the desired economy without incurring any burdensome changes in respect of compensation; and that, even where "grouping" may not be practicable, lines independently managed might effect considerable economies by co-operation with regard to the purchase of materials and stores. In the case of lines located in outlying areas it may not be possible to derive benefit from a centralisation of repairing work, but even these undertakings should be able to realise economies in respect of materials and stores.

(21) Particularly interesting evidence on the questions of "grouping" and "co-operation" has been received from Ireland, the unsatisfactory position of most of the light railways in that country being attributed in a large measure, to the lack of central management and to the absence of co-ordination generally between the various small undertakings concerned. In this connection attention has been drawn to an article entitled "Light Railways in Ireland" which appeared in the "Railway Gazette" of the 27th December, 1918. In that article a comparison was instituted between two groups of Irish narrow gauge railways, the first including only the County Donegal Joint Committee's lines and the Londonderry and Lough Swilly Railway (both comparatively large systems) and the second being made up of six other separate and smaller systems, namely, the Cavan and Leitrim, the Clogher Valley, the Cork and Muskerry, the Schull and Skibbereen, the Tralee and Dingle and the West and South Clare Railways. The comparison showed that, although both groups had approximately the same route mileage and traffic receipts and did not differ materially as to the quantity of rolling stock which they possessed, the ratio of expenditure to receipts in the first group was only .69 as against a ratio of .99 in the

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second group. The annual expenditure shewn under the heads of Way and Works, Locomotive Repairs, Carriages, Wagons, Locomotive Running, Traffic and General Charges respectively were far greater in the second group than in the first, whilst the number of train miles run was appreciably smaller (and the number of engine miles run was far smaller) in the second group.

(22) It was urged in the same article that the smallness of the separate systems in question was a potent cause of failure and that in undertakings of such a size it was impossible to pay such salaries as would ensure the engagement or retention of responsible officials of first rate ability. It was therefore suggested that a unification of the existing systems was desirable both as regards finance and management, provided that this unification did not involve the amalgamation of narrow gauge with broad gauge systems but was confined to narrow gauge lines alone. The necessity for co-operation between the narrow and broad gauge undertakings was recognised, but the problems involved in the operation of the former were held to be so essentially different from those with which the officials of broad gauge railways had to deal that in the process of amalgamation narrow gauge lines should be dealt with separately.

(23) Apart from the information contained in the article referred to above, evidence has also been received from Ireland with regard to the need for co-ordination and central control in matters affecting the purchase and repair of rolling stock in particular.

It is stated, for example, that the present lack of co-ordination in the purchase and design of material had led to differences of buffer heights on all the systems concerned, and that as a further consequence the methods adopted in the matter of repairs and maintenance are uneconomical. Each system has its own local shops for which skilled labour is difficult to engage and retain whilst for certain classes of mechanics, e.g. boilermakers, constant employment cannot be found. Again where the quantity of rolling stock is numerically small a steady flow of repair work cannot be arranged and periods of slackness and congestion occur. For example, heavy repairs to two or more engines may become necessary simultaneously, with the result that either running repairs have to be held over or the heavy repairs themselves are dealt with too slowly. The smallness of the separate undertakings is usually responsible for the fact that the local repair shops have a limited staff and are often inadequately equipped whilst, owing to the inability to offer attractive salaries and prospects, skilled superintendence of mechanical engineering work is difficult to secure and there is a tendency for the locomotive, carriage and wagon superintendents to fall out of touch with modern developments the application of which would make for economy and efficiency. Even where progressive men consent to remain in such positions they frequently find it difficult to induce their Directors to incur capital expenditure upon improvements of a profitable kind or to put in the necessary "stitch in time" in matters of renewal and maintenance.

(24) It has been suggested that the whole of the heavy repairs to Irish narrow gauge railway stock should

be centralised in one shop, preferably at Inchicore, and that locomotives, carriages and wagons requiring repair should be despatched to and returned from that shop on special bogie standard gauge trucks. In default of amalgamation this centralised system of repairs might be effected by agreement and a consulting engineer be appointed to advise not only with regard to repairs but also respecting the design and purchase of new rolling stock and mechanical appliances. In this connection much stress has been laid upon the desirability of effecting a standardisation of equipment as the rolling stock in use on the Irish Light Railways presents a great variety of design. For lack of standardisation these small undertakings are important to assist each other in matters of repairs and maintenance and vexatious delays occur in obtaining deliveries in response to small orders. It is urged that the suggested unification of management would facilitate the standardisation of designs and so pave the way to large economies. Incidentally, this standardisation would admit of a "common user" of rolling stock, the shortage of which is at present keenly felt by many undertakings.

(25) The arguments which have been adduced in favour of a unification of light railway systems in Ireland are similar to those upon which the suggestions for the "grouping" of similar lines in Great Britain have been based and there seems to be a consensus of opinion that a wider adoption of this principle of centralisation would lead to efficiency and economy and, by lightening the burden of administrative and other working expenses which now press so heavily upon the majority of light railways, would enable them to pay their way and give a more efficient service generally.

(26) In the foregoing paragraphs particular reference has been made to the organisation and management of light railways which are closely associated with main line undertakings, or with Local Authorities, or with other light railway undertakings. There are however many light railways the management of which is self-contained and entirely independent of any other organisation. The methods by which these lines are controlled are so far from uniform, and the number of controlling officers (and the duties assigned to each) vary so widely that it is impossible in any general statement to present even an approximately clear picture of their organisation and management. Each undertaking makes such arrangements as the circumstances peculiar to its own case may seem to dictate. A few examples will serve to show what a variety of practice exists.

(27) The Barryport and Gwendraeth Valley Railway a busy mineral line - is controlled by a Board consisting of a Chairman and three Directors. The working of the line is in the charge of a General Manager, with a Local Superintendent, and Accountant and Traffic Inspectors. The Secretary is a part-time official, a Solicitor by profession, and is located in London where the monthly meetings of the Board take place.

(28) The Campbeltown and Machrihanish Railway, an isolated line in the Mull of Kintyre, has its headquarters offices in Glasgow where the Secretary and Accounting work is done. The Secretary in this case also is a part-time officer. The actual working of the line is under the management of a Superintendent, stationed at Campbeltown, who is responsible.

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inter alia, for the compilation of all traffic returns and for the supervision of the staff.

(29) The whole of the working of the Cleobury Mortimer and Ditton Priors Railway is under the personal supervision of a General Manager and one assistant. No other supervisors are employed. The Secretary, who is located in London, is a part-time officer.

(30) The East and West Yorkshire Union Railway has a Secretary and Traffic Manager (combined), a Locomotive and Wagon Superintendent, a Traffic Inspector, a Permanent Way Inspector, three Goods Agents and a staff of seven Clerks.

(31) The Knott End Railway is controlled by a Board of Directors having a Secretary and Head Office in London. The Manager, with a staff of three Clerks, is located at Knott End, and the work which on larger lines is usually allotted to separate Departments (Engineering, Locomotive Superintendents, Traffic, Rating, etc.) is dealt with in the Manager's Office. Heavy work in the Engineering Department is dealt with by a Consulting Engineer.

(32) The Ballycastle Railway is under the control of a General Manager who acts also as Secretary and Accountant and the offices of Locomotive Engineer and Permanent Way Engineer are also held jointly by one person.

(33) The Cork, Blackrock and Passage Railway is controlled by a Board of four Directors, and the executive officers comprise a General Manager and Engineer (joint), a Locomotive and Marine Superintendent (joint), an Accountant and General Manager's Chief Clerk (joint), a Secretary and Treasurer (joint), an Audit Accountant, and a Storekeeper.

(34) The Londonderry and Lough Swilly Railway - a larger undertaking - has a more elaborate organisation. The general Manager acts as Secretary. The maintenance and operation of the locomotives and rolling stock are in the charge of a Locomotive Superintendent, whose staff consists of an Assistant Locomotive Superintendent, a Running Inspector, Drivers, Firemen, Shop Staff, etc. The maintenance of the permanent way, bridges, etc. is in the charge of an Engineer, assisted by an Assistant Engineer, Inspectors, Gingers, etc. The usual audit work, the preparation of pay bills, the custody of the moneys of the Company and much of the purely accounting work are in the hands of an Audit Accountant having a staff of six assistants. The control of stations, the disposition of the staff, the general operation of the traffic, and all commercial matters are controlled directly by the General Manager with the aid of an Assistant Manager and a staff of 17 persons.

(35) In view of the present financial position of the majority of the existing light railways in the United Kingdom, and in connection also with the problem of future development, the question of wages and of the hours and conditions of labour has now acquired an added importance. Even under pre-war conditions the average light railway undertaking - already burdened with a heavy capital expenditure and having only a small or moderate traffic - found it difficult, if not impossible, to secure in the shape of gross receipts a sum bearing a reasonable proportion to the amount of capital

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involved. When it is borne in mind how large a part of the cost of maintenance and operation is inevitably determined by the cost of labour even when the conditions in this regard are favourable, it is manifest that the problem with which light railways have to deal has been rendered more acute by the economic changes which have taken place since the outbreak of war.

(36) Any exhaustive consideration of the cost of industrial labour involves the examination of many different factors, and all of these cannot be adequately discussed within the compass of a brief memorandum such as this. The degree of efficiency displayed by the individual employee, for example, is a factor hardly less important than the amount of his wages; and both of these, again, are inter-dependent. Important, however, as this and other such aspects of the problem of labour undoubtedly are, it will perhaps suffice to deal herein with the three main causes of the recent enhancement of the cost of the labour employed in light railway undertakings. These are (a) the increase in the rates of monetary wages (b) the shortening of the hours of labour and (c) the restrictions upon the employment of railway servants on duties of a mixed or "hybrid" character, or upon "split" duties.

(37) There is a general consensus of opinion that the difficulties involved in the working of light railways have been intensified by the increase in the rates of monetary wages which has taken place during recent years without having been accompanied by any adequate compensatory increase in rates and fares; and, even if the present powers of charging were to be sufficiently enlarged, it is doubtful whether in every case their application would result in anything like a corresponding increase of revenue. It has been found that, where the light railway concerned has a short mileage, an increase in charges diverts traffic to the roads.

(38) The incidence of the present high rates of wages must be severely felt by all light railway undertakings - even by those which do not happen to be subject to Government control and which are so far remote from the main lines that they can escape the full competitive force of the high wages which are paid by these larger companies. The pressure is particularly felt, however, by those light railways which are subject to Government control and by those "uncontrolled" lines which are so situated that they cannot obtain the necessary labour except at rates which are closely comparable with those in force on the main lines. It might, of course, be argued that the undertakings which are subject to Government control and whose net receipts are maintained by State guarantee at the 1913 level are thereby relieved of anxiety with regard to labour charges generally, but to such an argument there are obvious qualifications. The Directors and Managers of these undertakings are apprehensive lest the additions which have been made to labour costs during the period of control may remain to be borne thereafter by the undertakings themselves. Moreover, the argument cited above takes no account of the fact that in 1913 the financial position of certain light railways was steadily improving and that, although the developments then in progress have continued and "fructified" during the period of control, the undertakings concerned have been prevented by the terms of the State Guarantee from receiving any benefit in the shape of an addition to the amount of their net receipts.

(39) In the evidence which has been received by the Committee from light railway companies it has been contended with great emphasis, that those which are subject to State control have been compelled to adopt rates of wages and other conditions of labour which have been fixed with reference to the circumstances obtaining on the large main lines and are quite inappropriate to light railways. As a general rule the traffic on these latter lines is comparatively trifling, the train services are infrequent and many of the duties which the staff are called upon to perform are far less constant and arduous and of a very small simple character than those which have to be discharged in ordinary course by main line employees; and it is contended also that the financial resources of the light railways are necessarily so limited that they should not be expected to conform to standards which have been set up with particular regard to the financial capacity of the larger lines.

(40) It has been pointed out, in this connection, that during the period of control labour questions have been settled without consultation with or representation of light railway companies; and it is asserted that, in the settlement of rates of payment or of matters relating to the grading of staff, no care was taken by those conducting the negotiations to protect the interests of these undertakings. The action taken in these matters has been compared unfavourably with the policy adopted in the case of the Docker's Award, when small ports, harbours and estuaries, were exempted from the application of the general settlement - a course which is understood to have been adopted as a result of consultation between the persons responsible for making the settlement and the representatives of the small undertakings concerned.

(41) The effect of the arbitrary application of main line standards to light railways has been so vividly pointed out in statements made to the Committee respecting certain undertakings which are not State-controlled that a reference to one or two of these may not be out of place.

In the case of a particular light railway which was opened for traffic in October 1916 and was therefore confronted at the outset by the many difficulties arising out of the prosecution of the War it was pointed out that it had nevertheless been able to pay the working expenses, and the following explanatory comment was made:-

"The undertaking has had the advantage of being a non-controlled line, and, therefore, of being worked on a business-like basis. The great disadvantage of small controlled lines, which have been compelled to carry out regulations entirely intended for large undertakings and quite inapplicable to small Companies, has fortunately been avoided."

In the case of another light railway which is controlled it was stated that the line showed much promise and that a prosperous future was anticipated, "subject to reasonable terms being secured as to the exclusion from general Main Line Railway Agreements after the period of control" and to the company being "left to conduct its business" with a free hand.

(42) Even on uncontrolled light railways, however, the conditions of labour are stated to be largely determined in fact by main line practice and the small "agricultural" undertakings in particular are said to feel the adverse effects of the arrangements which are made between the controlled Companies and the Unions to which the staff of the latter belong. In this connection it has been pointed out as anomalous that, although the rates chargeable for the traffic carried by these small "agricultural" lines are lowest, they are nevertheless confronted with demands which they may be quite unable to meet.

(43) With regard to the hours of labour the application of the 8-hour standard to light railways and the elimination of "split" duties are stated to be largely responsible for the increase in working expenses, inasmuch as they involve either the employment of additional staff or payments for overtime which are out of proportion to the amount of work done in respect of such payments and bear no reasonable relation to the revenue earned. As already stated the traffic on the majority of light railways is small in volume and the train services are necessarily infrequent, with the result that periods of active employment and periods of slackness, and even of enforced idleness, necessarily alternate. In many cases the latter are so prolonged that the greater part of the period covered by an 8-hour day may consist of idle time; and, in the absence of any arrangement for the "splitting" of such attendances or for the employment of part-time labour, it is not infrequently necessary to employ two shifts of men for the performance of duties which are of so light and intermittent a character that the periods of active employment thereon do not amount in the aggregate to more than a fraction of the total time in respect of which payment has to be made. In some instances, of course, it may be found less expensive to provide by means of overtime for these margins of work which cannot be discharged within the periods of the normal 8-hour duties; but this alternative is not always practicable, and even where it is practicable the amount of the additional work to be provided for is frequently incommensurate with the expenditure involved. Whichever alternative is adopted the result may be, and often is, to throw upon light railway companies a burden of expenditure which their traffic does not warrant, which is to a great extent unremunerative and which their financial resources cannot properly bear.

(44) For similar reasons it has been represented that the elimination of mixed duties is inappropriate to light railway undertakings. In many instances, e.g. in the case of station duties, the work to be done is not only intermittent and small in volume but is made up, to a great extent, of duties of an essentially simple character. Frequently these do not contain any considerable element of responsibility and do not demand for their efficient performance such a high degree of skill as on the mail lines. In view of this it has been urged that any attempt to classify these duties with strict reference to the particular character of each and to allocate them accordingly to separate grades or individuals (as in main line practice) is out of place. There are cases for example, in which emancipation from main line practice would admit of the utilisation of train staff for the performance of station duties; and, in instances where the necessity for permanent station staff cannot be obviated, it would at least admit of a reduction in their numbers. It is claimed that in such cases as these the practice of light railway undertakings - if they are to be worked with reasonable economy - must cease to be governed by that of the main lines and that they must be

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free to engage staff and to allocate their duties with some regard to the amount of work to be done and the conditions under which it has to be performed.

(45) Enough has been said in the foregoing paragraphs to indicate the nature of the representations which have been made to the Committee on the subject of the high cost of labour. It might be added that it has been suggested that those light railway companies which have suffered loss in this respect by reason of the exercise of State control should receive compensation for such loss. It is also contended that uncontrolled light railways - if they can show that similar losses incurred by them are due to the action taken by the State - are entitled to like consideration.

A P P E N D I X J.

LIGHT RAILWAYS IN THE UNITED KINGDOM.

Basis of Rates and Charges, and the relation of these Rates to those on the Main Railway System.

(1) Passenger fares on light railways are usually calculated upon a mileage basis and are generally subject to the same maxima as those in force upon the Main Lines. In a few cases a different fare basis is in operation. On one line, for example, having only one class of passenger accommodation, the fares charged in 1920 were at the rate of 2d per mile for the single journey and 1½d per mile in the case of double journeys. In another case, where there is no third class accommodation, the Light Railway Order authorised a charge of 2d per mile, second class, and in 1920 this rating was actually in force except for the longer distance journeys.

(2) The practice with regard to "through" fares varies. In many cases through fares are in force, but on a considerable number of lines they are not. Where they are in force they are usually divided on a mileage basis. Sometimes they are dealt with by private settlement with the main lines concerned and sometimes they are apportioned by the Railway Clearing House.

(3) Freight rates are generally subject to the same maxima as those in force on the main line in whose district the light railway concerned is located although in several instances they exceed the main line maximum rates by about 25 per cent.

(4) The practice with regard to through rates (like that respecting through fares) is not uniform. On many lines, however, through rates are in force. These are fixed by arrangement with the main line companies and are dealt with either by private settlement or by the Railway Clearing House. After allowance has been made for the terminal charges due to the individual companies concerned, the division of the through rates is usually effected upon the mileage basis, but in some cases a light railway company is allowed, as a fixed proportion, a sum equivalent to the full amount of the local rate.

(5) Opinion with regard to the advantages of through rates varies widely. In one case it is stated on behalf of a Light Railway Company that they do not consider through rates advantageous, the maximum rates authorised being obtainable by the company without any disbursements having to be made to the Clearing House for the division of receipts. At the same time it is claimed that the Company thus avoids the additional expense for clerical labour which would otherwise be involved. Other companies assert that Clearing House charges are not unreasonable and that the amount of work involved is not more serious than that which has to be performed in connection with private settlements.

(6) Another light railway company complains of the difficulty experienced in inducing certain main line companies to agree to through rates. Another advocates through rates as being advantageous to the public and asserts that, by bringing light railways into closer contact with the main lines, they tend to facilitate the working and exchange of traffic.

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Yet another, whilst admitting that through rates are generally beneficial urges that, so far as the railway company is concerned, the choice must depend mainly upon the possibility of securing relays from the main line companies and upon the additional cost of staff to which the adoption of through rates is likely to give rise.

APPENDIX K.

LIGHT RAILWAYS ON THE CONTINENT.

Appendix K.
Belgium.

BELGIUM.

(1) Of all the Continental countries Belgium affords the most striking example of the extensive development of secondary or light railways.

(2) The conception of a system of secondary railways in that country found its first legislative expression in the "Law on Tramways" passed in July 1875; but, owing to the reluctance of the public to adventure their capital in the construction of such lines in rural areas, no appreciable development ensued, and a Commission was accordingly appointed in 1881 to consider:

- (a) the extent to which the State should intervene in the construction and working of "vicinal" (local) lines and the possibility of joint action by the State and the Provinces and Communes^x concerned;
- (b) the latitude to be allowed to such lines in the matter of rolling stock and traffic regulations; and:
- (c) the question of the possible competition which might arise between the "vicinal" (local) & the "main" railways.

With regard to (c) it should be mentioned *en passant* that the Belgian Government had already adopted and were then consistently pursuing the policy of acquisition of the main lines and that practically all of these are now owned by the State and are under the control of the departments of Railways, Posts & Telegraphs.

(3) Upon the report of the Commission of 1881 were based, the laws of May 1884 and June 1885, which established the Société Nationale des Chemins de Fer Vicinaux having as its object the construction and working of vicinal lines within the Kingdom and, if necessary, their extension into foreign territory.

(4) The facilities thus afforded for the construction of light railways may be judged from the rapidity with which construction has since proceeded, whilst the social and economic value of the lines so constructed may be gathered from the amount of the annual receipts. The following figures may be taken as illustrative of the development which took place during the earlier years of the Society's existence:-

^x The Provinces of Belgium are the nine main areas into which the country is divided. They correspond to the larger "counties" of England, whilst the Communes are the smaller areas analogous to those of the Urban and Rural District Councils, or of the Boroughs, in England.

Appendix K
Belgium

| <u>Year</u> | <u>Length</u> | | <u>Gross Receipts</u> |
|-------------|--------------------|---------------------|---------------------------|
| | <u>Authorised.</u> | <u>Constructed.</u> | |
| | km. | km. | Frs. |
| 1887 | 504 | 323 | 965,977 |
| 1890 | 960 | 753 | 2,929,875 |
| 1894 | 1,341 | 1,172 | 5,343,388 |
| 1900 | 2,384 | 1,840 | 9,841,515 |
| 1908 | 4,165 | 3,216 | 18,991,353 |
| | (160 lines) | | |

By the end of 1909 the total length of the lines in respect of which concessions had been granted - apart from seven lines with a length of 70 kilometres possessed by private Companies - amounted to 4,333 kilometres, and by the close of 1910 this figure had risen to 4,433 kilometres. At the 31st December 1913 concessions had been granted for 183 lines having a length of 4,892 kilometres - apart from the seven private Companies' lines already mentioned - and further extensions of the vicinal system were in contemplation at the outbreak of war. The period of the war of course was marked not only by a cessation of developments, but also by the destruction and dismantling of a large part of the existing system. According to the official report of the National Society for the period 1914 to 1918 inclusive, close upon half of the whole vicinal network had been so destroyed or dismantled; and although the number of lines "conceded" at the end of 1918 was 183, with a length of 4,917 kilometres a large proportion of this mileage was either non-existent or badly damaged.

The work of reconstruction was, however, vigorously undertaken with the financial assistance of the Government, and at the 31st December 1919, 2,750 kilometres were in operation, whilst it was then anticipated that three-fourths of the pre-war mileage would be in operation at an early date. Including the 7 lines (70 kilometres) owned by private companies, the total number of lines "conceded" at the end of 1919 was 191, having a "development" of about 5,000 kilometres, compared with a corresponding figure of 4,722 kilometres for the main railways.

The density of the vicinal system, as a whole, may be gathered from the fact that the average length of vicinal lines in Belgium per 10,000 inhabitants, (calculated in respect of the 184 lines conceded to the National Society) was about 6.5 kilometres or 4.05 miles.

Of about 4,226 kilometres of vicinal lines nominally "open for public service" 89.5% were worked by steam, 8.5% by electricity, and the remaining 2% partly by steam and partly by electricity.

In the Official report of the Society for the period ending on the 31st December 1918, the vicinal lines conceded to them were classified according to gauge as follows:-

| | | |
|-------------------|-----------------|--------------|
| 1-metre | 167 lines | 4,369.09 km. |
| 1.067-metres | 13 lines | 510.00 km. |
| 1.435-metres | 3 lines | 38.00 km. |

The question of gauge will, however, be more fully dealt with hereinafter.

(5) As already indicated above, the light railways in Belgium are constructed and administered by the Societe Nationale des Chemins de Fer Vicinaux - an institution which is, in effect, a public trust under Government Control and is for all practical purposes a Department of the State.

By Royal Decree, dated 24th June, 1885, the Society was founded with the express object of assisting agricultural and other industries - which were then suffering from serious depression - by the provision of light railways or steam tramways (excluding suburban tramways) to be so constructed and worked as to admit of the transport of produce at rates appreciably lower than those in force on the main railways.

The Government were satisfied that such an important work could not be left to private enterprise alone and that the solution lay in co-operation, - through the Society - between the State on the one hand and the Communes and Provinces and private investors on the other; and upon the Society was conferred the preferential right of constructing such vicinal railways as local authorities might desire, provided that the Government were satisfied in each case that construction should proceed. It was desired at the same time that no concession should be made to any other company or private party, except in a case where the Society had not sought a similar concession or had failed to construct a conceded line within the period fixed by the Government.

(6) The Society determines, after consideration of any particular project, the amount of the capital to be subscribed. At least two-thirds of this capital must be furnished by the State, the Provinces and the Communes; but in actual practice only a trifling proportion of the total has been subscribed from private sources. The proportions subscribed up to 31st December, 1913, and 31st December, 1919, respectively were as follows :-

| | <u>1913</u> per cent | <u>1919</u> per cent |
|--------------------------|-------------------------|-------------------------|
| By the State | 44.1 | 44.1 |
| " " Provinces..... | 27.9 | 27.9 |
| " " Communes..... | 26.8 | 26.7 |
| " private investors..... | 1.2 | 1.3 |

The State is legally empowered to subscribe as much as 50% of the total capital, and it is gathered that this is the proportion which is now usually provided by the Government in respect of new vicinal lines. In two cases quoted in the official Report for 1913 the State contributed 72.1% and 54.4%, respectively; but these would seem to be exceptional instances. In the earlier years of the operations of the Society the proportion actually contributed by the State was usually limited to 25%, the largest share of the capital being provided by the Communes for whose especial benefit the lines were constructed, and up to the end of 1893 the proportions contributed were as follows :-

| | |
|---------------------------|-------|
| By the State..... | 27% |
| By the Provinces..... | 28% |
| By the Communes..... | 40.9% |
| By private investors..... | 4.1% |

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The more recent figures available indicate that the State has now seen fit to ease the burden formerly borne by the Communes, although the reason for this is not quite clear.

(7) Neither the Provinces nor the Communes, however, are limited by law as to the proportion which they may subscribe. The contributions of private investors must not exceed one-third of the total capital subscribed, but, as already stated, the amount of private capital actually provided does not approach this limit. After the expiration of 90 years of the working of any line the State, Provinces, and Communes concerned have the right to buy out at par. the shares held out by private investors. The Communes (if they can show adequate security) the Provinces and the State may, - in lieu of one payment - advance their shares of the capital by annual subscriptions (or annuities) spread over a period of 90 years and calculated at $3\frac{1}{2}\%$ interest and sinking fund included. Against these annuities the National Society raises loans by the issue of $3\frac{1}{2}\%$ debentures, repayable by 90 annual drawings, the interest on these debentures being guaranteed by the State.

(8) Separate accounts are kept for each line and the charge which each shall bear in the general expenses of the Society is determined by the proportion which it supplies of the gross receipts of all the lines taken together.

When a line is worked at a loss the Society makes good the deficit, reserving to itself the right to recover the amount thereof from the subsequent profits of the line; whilst if the line is abandoned the loss is debited to the reserve fund.

After the deduction of working expenses and costs of maintenance the profits of each line are applied (a) to paying off the annual subscriptions of the public shareholders; and (b) to the payment of the first dividend - not exceeding $4\frac{1}{2}\%$ - to the private shareholders. If the profits are not sufficient to cover these first charges they are distributed pro rata to public and private shareholders alike.

If a surplus remains after the payments indicated under (a) and (b) have been made and the fixed charges for the services of the administrators and general director have been paid, the surplus is allocated thus:-

1/4 to the Reserve Fund of the line.
3/8th as a second dividend to shareholders, and
3/8th to the Society, to form a general Reserve Fund to meet possible losses and to permit of extensions and improvements of the whole system.

Subject to specific Government sanction the reserve fund of an individual line may now be drawn upon for the declaration of dividends.

(9) The National Society and its lines are relieved, as far as possible, from the payments of any dues, rates and taxes.

x For paid up shares taken up before March 1898 the limit was $4\frac{1}{2}\%$.

(10) The National Society is administered by a Council (Conseil d'Administration) composed of (a) a President nominated by the King, (b) four or six administrators, half of whom are nominated by the King and half by the general meeting of shareholders; and (c) a Director General.

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There is also a Supervisional Committee (Comité de Surveillance) appointed by the shareholders and having full powers of supervision over all the operations of the Society; and, finally, there is the General Assembly which meets annually and is made up of shareholders, members of the Council and of the Supervisional Committee, and the Director General.

(11) The procedure followed in obtaining a concession to construct a vicinal railway is somewhat complicated. The initiative is supposed in all cases to be taken by the Communes concerned who invite the Society to consider the question of constructing the line - undertaking, at the same time, to assist in raising the necessary capital and to bear the cost of any preliminary enquiries if the proposal should fail to mature. It sometimes happens, however, that the initial step is taken by a Commune in response to persuasive pressure brought to bear upon it by the Society. On receiving the application the Society submits a general outline of the scheme for provisional consideration by the Ministers of War and Railways respectively, the former being concerned from the standpoint of defence and the latter with the question of competition with the main railways. If these Departments concur the Government calls for details as to the cost and commercial possibilities of the line and the scheme is submitted to the Minister of Railways. (for the second time) and also to the Financial Minister who has power to determine the financial aid to be granted by the State. After examination by these two Departments the Government informs the Society whether, or not, it is prepared to authorise the scheme and the latter is then at liberty to arrange with the Provinces and Communes to obtain the necessary guarantees with regard to the capital; and the financial negotiations which ensue are often protracted.

When the capital is fully guaranteed the formal demand for the concession - accompanied by the necessary report, estimates, plans, etc. - is submitted by the Society to the Minister of Agriculture, Industry and Public Works. After preliminary examination (and perhaps enquiry) by the Department the papers are made available for inspection in the Town Hall of each Commune directly affected. Objections to the scheme are passed forward - with the opinions of the Communal Councils to the Provincial Councils and by them (with their own comments) to the Department for final examination. The latter may make such modifications in the scheme as it may deem advisable, and, if approved, the scheme is formally presented for Royal Assent.

The Society then carries out the work of construction and equipment, calling for tenders and placing contracts in the usual manner.

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(12) With regard to the acquisition of land required for the construction of vicinal lines where the appropriation of private property is considered necessary, the Society can acquire and expropriate the same in the name of the State in accordance with a decree of the 10th December, 1900.

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Payment must be made for the land acquired, with compensation to the owners for disturbance, and it has been stated that the terms demanded are usually onerous. The greater part of the vicinal system, however, is laid on or alongside roads, and where the road is sufficiently wide for the purpose no compensation is payable to the road authority. If, on the other hand the road has to be widened in order to accommodate the railway, such widening must be undertaken by the Society.

(13) Although the light railways of Belgium are constructed, equipped and owned by the National Society, the great majority of them have been handed over to private companies to work, this course having been decided upon after due consideration (a) of the difficulties which the centralised control of such a scattered system would involve and (b) of the advantages which would be likely to accrue from "local" management by persons having a direct interest in promoting the success of the lines. The decision taken in this matter is stated by the former Director General, M. de Burlet, to have been entirely justified by the results achieved.

The leasing of the lines is effected by public tender, the lease or contract usually containing provision for

- (a) the surrender of a proportion of the gross receipts, or
- (b) the surrender of a fixed amount plus 50% of any sum realised in excess of this.

The former method is usually adopted where the lines concerned are expected to prove remunerative and the latter method where there is no prospect.

The duration of the lease or contract is usually 30 years with power to cancel at the end of 15 years. The Society generally furnishes the necessary rolling stock whilst the working company undertakes to maintain it; but whether the Society leases the working of a line or not it remains, itself, responsible to the State for the maintenance of the rolling stock and equipment in good condition and for all that is indispensable to satisfactory working.

(14) The policy of the Belgian Government with regard to the construction and working of vicinal railways would seem to rest broadly upon the conviction that the benefits directly conferred upon the industries served by the lines, and less directly upon the whole community, are a sufficient warrant for the liberal assistance granted by the State; and, although an endeavour is made to place each line as far as possible on a self-supporting basis, it is not the primary object of the National Society to secure a commercial profit from each individual undertaking. Provided that the system as a whole succeeds in serving the larger end in view the Society would appear to be satisfied with a very modest return upon the capital invested therein, and may even allow an individual undertaking in some cases to continue to operate without yielding any such return.

The actual financial position of the system will however, be dealt with more fully below.

(15) As already stated, the construction and equipment of the vicinal railways are carried out by the National Society, tenders being invited and contracts placed in the usual manner.

The conditions to be observed in the construction and maintenance of the lines are laid down in the general "Cahier des Charges" in which the regulations governing a concession granted to the Society are embodied. With regard to construction the "Cahier des Charges" provides that the work shall be carried out in accordance with the plans annexed to the act of concession and with the more detailed plans to be subsequently approved by the Minister of Railways, etc., and it binds the Society to take measures to ensure that existing watercourses are not impeded and that, where necessary, new watercourses are provided. Steps must also be taken by the Society to avoid interference with public or private communications, with access to houses, or with traffic, and in this connection fences, signals, etc. must be provided where this is considered necessary by the competent authority. It is also stipulated that the materials used in construction shall be of good quality and the work executed by approved methods and under the direction of the supervising officials, and provision is made for the restoration of road surfaces disturbed in the course of construction, for the provision of temporary means of communication whilst the work is in progress and for the lighting and guarding of dangerous obstructions during the hours of darkness.

It is further provided that the Society may, with precedent Ministerial authority, make any necessary alterations in constructional details and must carry out at its own cost similar modifications which may be ordered by the Minister, and that the Society shall undertake, where this is necessary, the enlargement of public roads traversed by the railway. The provision already referred to respecting the appropriation of private property required for the construction of the lines is also embodied in the "Cahier des Charges".

(16) As already indicated the gauge almost universally adopted for the vicinal railways is 1-metre. Some lines are constructed, for short distances, with mixed gauges of 1-metre and 1.435 metres (4'8 $\frac{1}{2}$), a third - or a third and fourth - rail being provided for the purpose of enabling main line vehicles hauled by narrow gauge engines to use the vicinal railway and so gain access to factories, quarries, etc.

The 1.067-metre gauge has been adopted upon a few lines which run to the frontier of Holland and make connection with Dutch Light Railways of the same gauge. The normal gauge of 1.435 metres is found only on 3 lines of short length which connect with lines of Standard gauge at the French frontier.

(17) Of the lines open for traffic in 1912, 139 were connected by "junction" stations with the main lines, and there were in addition 414 private sidings provided for use in connection with agricultural or manufacturing industries. According to the official report of the Society for the year 1913 the number of "Exchange" stations at the close of that year was 158, whilst the number of private sidings was 513, of which 62 were for agricultural, 450 for industrial and 1 for

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military purposes. The "junction" is usually effected by means of an island platform for the transhipment of goods, the narrow gauge line being laid on one side and the standard gauge rails on the other side of this platform. The goods are usually transferred by hand and not in bulk. The passenger stations on the two lines are usually a short distance apart and the intervening distance has to be traversed on foot.

(18) In his Report to the Board of Trade dated March 1912, Lt. Col. Sir Arthur Yorke attributed the general acceptance of the metre gauge as being the most suitable for the vicinal lines in Belgium to certain specific considerations, namely, that it reduced the cost of construction equipment and working, minimised the risk of competition with the main railways and marked the difference between these latter lines and light railways in such matters as rolling stock, speed and working. The working of a light railway being essentially different from that of a main line it was considered an advantage to keep the men, engines, etc. employed on the one distinct from those employed on the other. It was felt for instance that, if a guard or a driver were likely to be employed one day upon a main line and another day upon a light railway, he would be less likely in the latter case to accommodate himself to the restrictions of speed and simpler methods of working in force. There was also the consideration that a narrow gauge line could be more easily accommodated on a public road.

At the date of Lt. Col. Sir Arthur Yorke's report the question of gauge had already apparently been the subject of much discussion in Belgium and an interesting reference to the matter has since appeared in the official Report of the Society for the period 1914-1918. It was there stated that, at a special sitting of the Conseil d'Administration in January 1918, the delegate of an interested Commune had raised the question of converting the vicinal lines to normal gauge and the Society added to their Report a special résumé of the discussions which had taken place on the subject in previous years at congresses of railway and tramway experts and of the conclusions at which these expert assemblies had arrived - conclusions with which the Society was in full accord. This résumé stated that certain interested communes desired that, as lines destroyed by the Germans must in any case be relaid, the opportunity should be taken to reconstruct them on the normal gauge. The Society however, reminded them that experts (engineers and economists), whilst admitting that each case must be considered on its merits, had for years been almost unanimously of opinion that in the great majority of cases the narrower (1-metre) gauge was preferable. Two main arguments against the adoption of the narrow gauge were quoted, namely (a) that the carrying capacity of a narrow gauge line was limited and (b) that the transhipment of goods and passengers at points of contact with the main lines was inconvenient and costly.

In reply to the first of these arguments the cases of the Festiniog-Portmadoc line and of certain Italian lines were cited as proofs of the opposite contention, and also the case of certain Belgian vicinal lines on which the annual receipts per kilometre amounted to 50,000 francs for lines carrying passengers only and to 20,000 francs for lines having both passenger and goods traffic. It was admitted that uniformity of gauge might be important in the case of lines carrying heavy traffic for long distances or for a system whose function it was to connect large centres of production and consumption

with the seaports and at the same time to maintain international communications. The vicinal lines, on the other hand, were said to be essentially lines of local interest, designed primarily to connect villages and small townships with each other and with the main lines. They were, in effect, merely "feeder" lines and the fact that there could be no exchange or rolling stock between them and the main lines did not prevent them from fulfilling their own more modest purposes with complete success. It was added also that, even if the vicinal lines were converted to normal gauge, the transhipment of passengers and of incomplete freight loads would still be necessary.

With regard to the inconvenience and expense involved in the transhipment of full loads it was held that the objections raised were based merely on theoretical assumptions and that, in actual practice, transhipment was effected with ease and at little cost by the simple method of raising the narrow gauge lines at junction stations so as to bring the floors of the wagons to the same level as that of the wagons on the main lines. The cost of transhipment by hand was stated to be at that time about 25 or 30 centimes per tonne^o, and from this it was argued that the cost of special devices for transhipment was only justified in very exceptional cases. For the great bulk of the goods carried any inconvenience involved in transhipment was far outweighed by the advantages incidental to the use of the narrow gauge, namely by the economies effected in the cost of construction and of operation.

With regard to construction costs, stress was laid upon the flexibility of alignment rendered possible by the use of short radius curves which reduced the cost of earthworks and special structures and made it possible to tap the sources of traffic more directly. The cost of construction of vicinal lines of narrow gauge in Belgium was said to be only 56,000 francs per kilometre as against 104,000 francs in the case of vicinal lines of normal gauge. With regard to the cost of operation it was argued that the use of lighter constructional material and lighter rolling stock had led to appreciable economies in the cost of maintenance and haulage.

The adoption of the normal gauge for vicinal lines was recognised as advantageous only in those cases where the vicinal line consisted of a short section connected with a main railway and was directly intended to serve for the regular transport of heavy goods, i.e. when the vicinal railway would be in effect an "industrial" branch of the main line.

Note: The French tonne = .984 of the English ton. In a visit to Belgium in 1911 Mr. Davidson (Great North of Scotland Railway Co.) was informed by the Assistant Director General of the Society that the cost of transhipment from a light to a normal railway was 6d. per ton.

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At the close of 1918 the National Society contended that all the arguments cited above still hold good. They set their face against all the suggestions made for the relaying on normal gauge of those vicinal lines which had been dismantled or destroyed during the War; and, even in the case of short industrial lines carrying heavy goods in large and regular quantities, they preferred that a mixed gauge (voie à 4 rails) should be adopted, the trains to be hauled by narrow gauge engines and the goods to be loaded on normal or narrow gauge wagons according to their destinations. The Society added that this method had been tried with marked success in several instances and that they intended to apply it to other lines on which the traffic was sufficiently great to justify the additional cost involved in laying the double tracks.

In their most recent Report, for the year 1919, the Society stated that in relaying certain lines in the Province of Antwerp which had been destroyed or damaged during the war they had actually taken the opportunity to convert these from the gauge of 1,067 metres to the 1 metre gauge, and that, in order to secure uniformity of gauge on vicinal lines throughout the whole country, even lines which had not been demolished were being similarly altered. This action would seem to indicate that the Society is steadily maintaining its adherence to the principle of the narrow gauge.

(19) The average cost of constructing the vicinal lines worked by steam (including the provision of rolling stock) was stated by the former Director-General (M.Burlet) as follows:-

| | |
|------------|------------------|
| 1890 | £2,771 per mile. |
| 1900 | 3,063 " " |
| 1905 | 3,545 " " |
| 1907 | 3,596 " " |

and for lines worked by electric traction:-

| | |
|------------|------------------|
| 1900 | £8,702 per mile. |
| 1905 | 9,042 " " |
| 1907 | 10,855 " " |

The lines are laid, for the most part, on or alongside streets and roads, which they are entitled to use provided that the minimum width of the road is not less than 7 metres (23 feet). If the width of the road be less than this, land must be obtained either for widening the road or for the accommodation of the railway on a route apart. The tendency in recent years, however, has been to avoid the use of the roads and to construct the lines upon land specially acquired for the purpose as by this means more suitable gradients and sometimes a shorter route can be obtained whilst certain inconveniences and dangers incidental to the use of the roads can be avoided. To this, as well as to the gradual increase in the cost of labour and material, the steadily ascending cost per mile for the construction of vicinal lines may be attributed. A part of the increase in cost is doubtless also due to the fact that the State no longer allows a light railway to cross a main line on the level.

A vicinal line passing along a road may be laid either upon the metalled or paved surface or upon the "waste" at the roadside, where such is available. In the former position, and at crossings, the rails must be grooved and laid flush with the surface; but where the track is laid by the side of the road

Vignoles rails on cross sleepers are used, and the line is slightly raised above the road level and separated therefrom by a stone kerb. Care is supposed to be taken not to interfere with access to houses, etc., at the side of the line, but this does not seem to prevent a track from being laid immediately in front of inns and private houses. In the case of the Brussels-Haecht line, for example, the width of roadway left clear for the ordinary traffic is 16 feet, and the average distance from rail to house fronts is 9 feet, but, at one point at least, the clearance between the sides of the railway coaches and the house frontage line is only 2½ feet. Where, however, the roadway is too narrow to admit of even the minimum clearance the track is diverted for a short distance so as to pass in the rear of the houses.

(20) The rails used are usually of the following weights per yard:-

| | | |
|----------|-----|--------------------------|
| Vignoles | { | 1-metre gauge - 46 lbs. |
| | | (Normal gauge - 60 lbs. |
| Grooved | ... | ... - 60 to 90 lbs. |

In some cases the Vignoles rails weigh rather less than 46 lbs. but apparently seldom, if ever, less than 42 lbs. per yard. They are made in lengths of 9 metres (30 feet) and the grooved rails in lengths of 18 metres. They are laid on cross sleepers of creosoted oak measuring about 6' 0" x 8" x 4" of which there are 10 or 11 per length of Vignoles rail and 15 per length of grooved rail. Concrete foundations such as are found on English tramways do not appear to exist. The rails are secured to the sleepers by 5½" screws the heads of which grip the flanges, and in the case of Vignoles rails bearing plates are laid between the rails and the sleepers. The screws passing through these bearing plates assist to keep the line to gauge. Formerly dog spikes were used to fasten the rails to the sleepers, but these were found unsatisfactory and have been abandoned in favour of screws. The distance between the joint sleepers is only 21 inches.

(21) The lines as a rule are fairly well ballasted with clean material (gravel, stone or cinder) having a depth of about 2' below the sleeper. Where the lines are laid on the metalled or paved portions of the roadway the surface is of course made up "flush" with setts, wood blocks or ordinary macadam.

(22) The joints of the Vignoles rails are fitted with 17" angle fish-plates which grip the web and extend over the bottom flanges of the rails and rest upon the sleepers on either side of the joint. The joints of the grooved rails are fitted with fish-plates similar to those employed in England. These rails have a tread of 1.8 inches and the groove is 1.4 inches wide and 1.2 inches deep.

(23) The minimum radius usually permitted for curves in towns is 30 metres (98.5 feet) though in some instances a radius of only 25 metres (82 feet) is employed. Outside towns the limiting radius is 246 feet, but in actual practice it is seldom less than 100 metres, or 330 feet. As sharp curves are so frequent, e.g. in towns and factories, the National Society has made a special study of the subject and laid down particular

rules with regard to super-elevation and the setting out of parabolic curves. In the case of road railways it is considered desirable to secure the necessary cant by lowering the inner as well as by raising the outer rail and the Society has adopted the usual formula, $E = \frac{g}{R}$, in which G = gauge, V = maximum speed, g = accelerative force of gravity per second and R = radius of curve.

(24) The steepest gradient allowed on lines worked by steam is 30 millimetres per metre or about 1 in 33, whilst on electrically operated lines the limit is 45 millimetres per metre or about 1 in 22. In actual practice gradients are seldom more than 1 in 40, but on the Brussels-Espinette Electric Railway there are short gradients of as much as 1 in 22. (One observer of this line put the maximum gradient at 6 $\frac{1}{2}\%$, but possibly the correct figure is about 1 in 22).

(25) The speed of trains is limited as follows:-

1. It must never exceed that which would permit of a train being stopped by means of the brakes on the engine alone within a distance of 30 metres, even on the steepest gradient.
2. In no case must the speed in open country exceed 30 kilometres (18.6 miles) per hour.
3. In towns and villages the maximum speed allowed is 10 kilometres (6.2 miles) per hour.

The average or "journey" speed is variously stated by different observers, but Lt.Col. Sir Arthur Yorke stated that it did not exceed 12 miles per hour and was often less.

In special cases the speed is limited to walking pace and the train must be preceded by a man on foot, and speed must also be reduced in the event of horses or other animals being alarmed by the passing of the train. The engine whistle is sounded as a warning signal in the country and a horn or bell is used when passing through towns or villages.

(26) The National Society is under no obligation to fence vicinal lines whether these pass along roads or are laid on lands specially acquired. Where the lines pass through grazing land they are usually fenced, but this is done by the land owner or occupier in his own interests. The bulk of the land in Belgium, however, is arable and in actual practice fences are conspicuous by their absence.

At level crossings over roads no gates or bridges are provided. As a rule such crossings are entirely unprotected save for a notice board erected to warn pedestrians; and in the few cases in which a gate is found it has apparently been provided only to meet the wishes of some particular Communal authority.

(27) The Government regulations prescribe that all "necessary" measures shall be taken to safeguard the trains on the railways and the pedestrian and other traffic on the roads, and also that signals worked by watchmen must be placed at

particularly dangerous places; but in actual fact signals are almost unknown, being only used in exceptional cases, e.g. where a light railway crosses a main line on the level, or near swing bridges over canals or rivers. On single lines a painted post is usually erected near each end of a passing loop in order to warn drivers to reduce speed and be prepared to stop, and similar posts are provided at other particular points such as curves) where a reduction of speed is considered necessary.

At passing loops or siding connections the levers are not interlocked, the points being worked by weighted hand levers such as are used in English goods yards. Occasionally the points are secured by chains and padlocks which are operated by keys in the possession of the train guards. Safety catch points are not provided at the junctions of sidings with the main track, but at some places hand-worked "scotches" are employed to prevent vehicles in the sidings from fouling the passenger lines.

Telephone communication is provided at each stopping place, for working purposes, but no block instruments, train staffs or tablets are used.

(28) Stations, in the English sense of the term, are few in number. The "station" so-called (where it exists at all) is usually only a cafe or village shop which passengers may use as a waiting room, and the owner of which is prepared (without receiving any allowance from the concessionaire) to receive incoming and outgoing parcels. In some cases tickets may be obtained at these places, but these are more usually issued by the guards on the trains. No platforms are provided at the stopping places; passengers can enter the train direct from the ground. At all such stopping places the station work and switch movements are carried out by the train staff.

(29) With regard to maintenance the "Cahier des Charges" respecting a vicinal railway provides that the Society shall keep the line and all its buildings in good repair during the whole period of concession, and that it shall similarly maintain all other works for a period of 12 months from the date of their completion. The object of this is to ensure the assistance of the Society not only in the original establishment of the line but in connection with subsequent alterations and improvements. The portions of the roadway which the act of concession binds the concessionaire to maintain and also the rolling stock, must be kept in good repair and proper provision must be made for the drainage of surface water from the line.

The regulations provide for the examination of locomotives before they are brought into use, and for the enclosure of all moving parts which might otherwise be a source of danger to passengers and others, but at the date of Lt. Col. Sir Arthur Yorke's report (1912) there was a tendency to relax this restriction.

(30) The rolling stock - original and additional - is supplied by the National Society.

The engines are 6-coupled and, in working order, weigh $27\frac{1}{2}$ tons. They have $2' 11\frac{3}{4}''$ driving wheels and a wheel base of $8' 3\frac{3}{8}''$ and are not capable of running at high speeds.

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They have a foot-plate and cab at each end so that, whilst the fireman always remains at the firebox end, the driver can take the leading position. Brake handles, regulator, reversing gear and a whistle are provided in each cab to ensure complete control by the driver. Every engine is fitted with steam and hand brakes. The fuel used is coal or briquettes. In 1911 the Society were making an experimental test of benzine electric cars on the Espinette-Waterloo line, but the result of this test has not been ascertained.

The goods wagons fall into 3 main categories - open, closed and flat trucks. They are about $17\frac{1}{2}$ feet long, weigh from 3 to 4 tons, and their carrying capacity ranges from 5 to 10 tons. They are usually of the 4-wheeled type with iron or steel underframes and a wheel base of about 6 feet. Each is fitted with a screw brake and, frequently, with a seat for the guard or brakeman.

The passenger vehicles are usually 4-wheeled coaches, with a 6-foot wheel base, and as they are usually over 20 feet long there is a considerable amount of overhang at each end. Some which are of greater length are fitted either with radial axle boxes or with bogies. An ordinary coach weighs from $4\frac{1}{2}$ to 5 tons and the floor is about 2'3" above the road level. The passenger accommodation is of two classes, first and second, and some of the coaches are of the composite type. The cars have doors and platforms at both ends and the conductor can pass from end to end of the train. The seating accommodation seems to vary, but the usual number of seats would appear to be from 20 to 24.

The number of engines, coaches and wagons in service has of course been greatly affected by the incidents of the War, but it may be of interest to state the proportions which existed in 1912 between the number of locomotives, etc. and the number of kilometres of line open for service. The figures were:-

| | |
|---|---------------------------|
| 1 Locomotive..... | per 4.97 Km. (3.08 miles) |
| 1 Passenger Car (or carriage and van combined)..... | per 1.87 " (1.16 ") |
| 1 Van..... | per 8.57 " (5.32 ") |
| 1 Goods Wagon..... | per 0.53 " (0.32 ") |

The stock was then apparently sufficient, except perhaps during the harvest period.

Ordinary screw couplings are used for both passenger and goods vehicles. The coupling is attached to one end of a short transverse bar which is connected in the centre with a draw-bar, the other end of the transverse bar being fitted with a coupling hook. The coupling on one car is opposite to the hook on the next car, so that the whole forms a sort of "swing-tree" arrangement such as is often seen on horse-drawn vehicles. The trains may be said, therefore, to be double-coupled throughout. The use of automatic couplings had been contemplated from time to time, but owing to the expense involved in making the change the idea was abandoned.

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The vehicles have central buffers, so placed as to work clear of the couplings. When trains of mixed gauges are run, a special wagon is introduced (between the vehicles of different gauge) with couplings so arranged that the necessary connection can be made in front and rear.

Trains may be composed entirely of passenger vehicles or of goods vehicles, but as a rule they are "mixed". The length of the train varies according to the power of the locomotive employed, but the maximum load appears to be 18 empty wagons, which is the equivalent of 11 passenger coaches and one van, or of 6 fully loaded goods wagons. In towns, as a rule, the train consists of only one or two carriages behind the motor vehicle. On lines running the country trains of 6 to 8 passenger coaches are common. Passenger coaches, whether in a mixed train or otherwise, usually have a brake van or compartment either in front or rear; and in mixed trains the goods wagons are placed nearest the engine. Freight trains do not usually have a brake van in the rear; the brakeman occupies the last vehicle and can there work the screw brake of that particular wagon and (if necessary) can pass from wagon to wagon to work additional brakes.

(31) Each train conveying passengers is accompanied by a guard or conductor. On a mixed train there is, in addition, a guard or brakeman in charge of the wagons. A goods train pure and simple has one or more guards or brakemen as may be considered necessary. Thus, every train is accompanied by at least 3 men - a driver, fireman and guard.

The traffic is conducted according to a time schedule, rigidly observed. The places at which trains on single lines must pass each other are specified and no departure from the schedule is allowed except by order of the Traffic Superintendent. Every guard and driver is provided with a copy of the working schedule; and, when a special train is run, the guard and driver thereof receive copies of written train orders prepared in triplicate in the Superintendent's office. At the same time telephonic orders are sent along the line to the guards or conductors of all other trains concerned. These guards or conductors then prepare similar orders in triplicate and distribute them - one copy being retained by the guard, one handed to the driver and one forwarded to headquarters. In the case of an accident or breakdown a similar procedure is followed.

Block working in the English sense of the term is unknown; and, although under the system described trains travelling in opposite directions on a single line cannot meet, two trains running in the same direction may be in the same section simultaneously, provided that the interval between them is not less than 500 metres.

At stopping places where shunting operations have to be carried out the fireman operates the points, the signals to the driver being given by the guard - by trumpet. Loose shunting does not seem to be permitted, and no shunting is allowed at any place unless and until all trains which may be due there have arrived. In the loading and unloading of goods and parcels at stopping places the guard is assisted by the stoker.

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In a case of accident the guard telephones to headquarters for any assistance required; and in cases of simple derailment the operations necessary for restoring the situation are under the direction of the driver.

(32) Mails are carried free of charge to the State. A letter box must be carried on the rear vehicle of every passenger train, so that correspondence may be posted at stopping places. The box key is held by the postal officials, and at the principal stopping places a local postman opens the box and withdraws the letters proper to his particular district.

(33) The Rules and regulations for working, indicated above, relate mainly to steam lines, but so far as they are applicable, they are in force on electric lines also.

In the case of vicinal lines worked by electric power, it is customary, and is considered more economical, to purchase the current from local generating companies rather than to set up plant for the special purposes of the railways or tramways.

(34) The train services are good, the minimum number of trains run daily on any line before the War being 5 each way, and, according to Mr. Cole, the National Society might call for an increase in the number of trains if and when the gross receipts (taken on a monthly basis) averaged more than £s. lld. per train mile.

(35) With regard to accidents, collisions and derailments are said to be few. The numbers of persons killed and injured from all causes in 1919 were 40 and 118 respectively. None of the fatalities was due to derailment or collision, whilst the numbers injured through these two causes were 9 and 73 respectively. The following details are taken from the Society's official Report for 1919:-

| Accidents to | Injured. | | | | | Killed. | | | | |
|-----------------------------------|----------|------|------|------|------|---------|------|------|------|------|
| | 1911 | 1912 | 1913 | 1914 | 1919 | 1911 | 1912 | 1913 | 1914 | 1919 |
| Passengers | 87 | 30 | 87 | 21 | 95 | 9 | 2 | 10 | 6 | 14 |
| Employees | 11 | 4 | 11 | 7 | 5 | - | 3 | 4 | 4 | 3 |
| Other persons | 40 | 38 | 51 | 39 | 18 | 45 | 56 | 57 | 20 | 23 |
| Totals | 138 | 72 | 149 | 67 | 118 | 54 | 61 | 71 | 30 | 40 |
| Totals per million Kilometres run | 4.43 | 2.17 | 4.19 | - | - | 1.73 | 1.84 | 2.00 | - | - |

(36) With regard to Fares and Rates for passengers, goods and luggage conditions have no doubt been greatly modified by the War; but prior to 1914 each line had a special tariff of its own. The bases of the respective tariffs were set forth in the Cahiers des Charges and no rates or fares could be altered by the Society except by State authority. The State itself could, however, alter the tariff at any time, and it is said to have been the policy of the Government to raise the rates whenever a vicinal line came into competition with a main State railway.

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The conditions of transport were also laid down in the Cahier des Charges of each line.

The kilometric basis was used for the calculation of rates and fares, with a minimum of 2 Km. in the case of passengers, and each Km. begun counted as a full Kilometre.

Passengers had certain claims to indemnities for delays incurred. Children under 3 years of age were carried free and those under 8 years at half the normal rates. Half rates were also charged to soldiers in uniform (and officers in uniform or plain clothes) and to club members and schools travelling in parties of not less than 20 and 10 respectively. Excursion tickets were issued at single rate for the return journey.

A few specimen (ordinary) pre-war passenger fares are indicated below:-

| Kilometres | Single | | Return | |
|------------|---------------------|---------------------|---------------------|---------------------|
| | 1st Class Fr. C. | 2nd Class Fr. C. | 1st Class Fr. C. | 2nd Class Fr. C. |
| 1 | 0 15 | 0 10 | - | - |
| 2 | 0 15 | 0 10 | - | - |
| 5 | 0 35 | 0 25 | 0 60 | 0 40 |
| 10 | 0 70 | 0 50 | 1 15 | 0 80 |
| 20 | 1 40 | 1 00 | 2 25 | 1 60 |
| 30 | 2 10 | 1 50 | 3 40 | 2 40 |

It will be noted that the return fares were roughly 60% in excess of the single fares.

The charges made for the conveyance of passenger luggage varied according to weight and distance. A few examples are quoted below:-

PASSENGER LUGGAGE.

| Kilometres | Weight in Kilogrammes. | | | | | Charges per 100 Kgm. Fr. C. |
|------------|------------------------|--------------------|--------------------|--------------------|--------------------|--------------------------------|
| | 20 or less Fr. C. | 31 to 40 Fr. C. | 51 to 60 Fr. C. | 71 to 80 Fr. C. | 81 to 90 Fr. C. | |
| | | | | | | |
| 1 to 5 | 0.20 | 0.20 | 0.20 | 0.25 | 0.25 | 0.30 |
| 6 " 10 | 0.20 | 0.25 | 0.35 | 0.45 | 0.50 | 0.55 |
| 16 " 20 | 0.25 | 0.45 | 0.70 | 0.90 | 1.00 | 1.10 |
| 31 " 35 | 0.40 | 0.80 | 1.20 | 1.60 | 1.75 | 2.00 |

For Pupils' Season Tickets the rates varied according to distance and to the periods for which the tickets were taken, separate rates being also quoted for tickets available for 12 or 14 journeys per week respectively. For quarterly tickets (12 journeys per week) the rates varied as indicated below:-

| Kilometres. | 1st Class. | 2nd Class. |
|-------------|------------|------------|
| 1 to 5 | 16 fr. | 12 fr. |
| 6 | 20 " | 14 " |
| 8 | 27 " | 20 " |
| 10 | 35 " | 26 " |
| 12 | 42 " | 31 " |

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The annual rates were about 3 times the quarterly rates. For Ordinary Season Tickets, taken for quarterly periods, the charges were

| <u>Kilometres</u> | <u>1st Class.</u> | <u>2nd Class.</u> |
|-------------------|-------------------|-------------------|
| 1 | 16 fr. | 12 fr. |
| 5 | 39 " | 28 " |
| 10 | 49 " | 35 " |
| 15 | 59 " | 42 " and so on. |

Here again the annual rates were about 3 times the quarterly rates.

For Workmens Season Tickets (12 journeys per week) the rates were:-

| | | | |
|------------|-------|-------|-------|
| Kilometres | 1 - 2 | 0 fr. | 60 c. |
| " | 3 | 0 " | 75 " |
| " | 5 | 1 " | 20 " |
| " | 10 | 1 " | 70 " |
| " | 15 | 2 " | 25 " |

(37) The regulations with regard to the carriage of Goods, (light consignments, live animals, valuables, etc.) forwarded between places served by one vicinal line provide for delivery at the destination station within 24 hours from the date of acceptance for transport. For heavier consignments the corresponding period is 48 hours, counted from midnight of the day of acceptance. In the case of consignments passing between points on different lines the periods stated above are suitably extended.

The period allowed for unloading of wagons is counted from the time of the despatch of the advice note to the consignee. Goods must be taken away within 8 hours - night hours, Sundays and holidays being excluded from the reckoning. A period of 5 hours is allowed for the return of wagons from private sidings. In the event of failure to unload goods within the time allowed charges are made for demurrage and storage. Prior to the war the ordinary charges made on this account were:-

For goods unloaded but not removed 2 c. per day per 100 Kgrms.

For goods not unloaded 25 c. per hour per wagon.

In each case the minimum charge was 10 centimes.

The following figures are taken by way of example from the schedules of goods rates charged for part loads before the war:-

| Kilometres. | Charge per 1000 Kilogrammes. | | | | Charge for small consignments up to 100 Kilogrammes. | | | |
|-------------|------------------------------|----|-------|----|--|----|------|----|
| | Fr. | c. | Fr. | c. | Fr. | c. | Fr. | c. |
| 1 to 10 | 1 | 65 | to 3. | 00 | 0 | 20 | to 0 | 80 |
| 11 " 20 | 3 | 15 | " 4 | 50 | 0 | 25 | " 1 | 10 |
| 21 " 30 | 4 | 65 | " 6 | 00 | 0 | 30 | " 1 | 40 |
| 51 " 60 | 9 | 15 | " 10 | 50 | 0 | 50 | " 2 | 30 |

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Above 400 Kgms. certain subsidiary charges were made, namely:-

For registration, 20 c. For forwarding advice note, 10 c. For handling, 5 c. per 500 Kgms. For use of unloading appliances, 3 c. per 100 Kgms.

The freight charges for full loads were divided into 3 classes:-

Class A, applying to goods forwarded in covered wagons.

Class B, " " " in open wagons - not being merchandise of the kinds included in Class C.

Class C, applying to the majority of goods likely to be transported by the vicinal lines and which were forwarded in open wagons.

Specimen rates per ton for full loads were:-

| Kilometres. | Charge per ton, for 5-ton lots. | | |
|-------------|---------------------------------|-----------------|-----------------|
| | Class A. Fr. | Class B. Fr. | Class C. Fr. |
| 1 - 10 | 0. 63 to 1. 80 | 0.61 to 1. 60 | 0.57 to 1.20 |
| 11 - 20 | 1. 93 " 3. 10 | 1.71 " 2. 70 | 1.27 " 1.90 |
| 21 - 30 | 3. 23 " 4. 40 | 2.81 " 3. 80 | 1.97 " 2.60 |
| 51 - 60 | 7. 13 " 8. 30 | 6.11 " 7. 10 | 4.07 " 4.70 |

When consignments consisted of goods of various classes the rates proper to the highest class were charged for the whole consignment.

Special rates were in force for the benefit of particular industries e.g. for the transport of building bricks, coal, lime, beetroot pulp, etc.. These special rates were considerably lower than the "Class C" rates quoted above. It is stated, however, in the Society's Report for 1919 that owing to the conditions produced by the War these special tariffs have had to be abolished.

As long ago as 1913 and early in 1914 negotiations for a general revision of the tariffs on the vicinal lines were in progress between the Society and the State, but these were interrupted by the outbreak of war. The changes brought about by the War naturally rendered the position with regard to rates and fares still more acute and by a decree of the 22nd March 1919 an all-round increase of 40 per cent was authorised. This, however, was found insufficient and by a later decree of the 14th February 1920 a further increase was sanctioned making a total advance of 100 per cent on pre-war figures.

(38) With regard to the finances of the Society the following figures are taken from the official Report for 1919; but, as the present financial position is to some extent the result of the abnormal conditions created by the war, a few details taken from the Report for 1913 (the last normal year)

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are also given below:-

1919.

| | <u>Fr.</u> |
|---|---------------|
| Total Capital at 31st Decr. 1919 | 373,645,000 |
| Cost of acquisition of land up to 31st Decr. 1919 | 39,248,720 |
| Percentage of gross receipts derived from - Passengers and Luggage | 73.65% |
| Goods and Miscellaneous Articles | 26.35% |
| Ratio of Working Expenses to amount of gross receipts | 85.94% |
| Profits on operation to be distributed as dividends, after allowing for reserves, dividends in arrear, losses in operation of individual lines, etc., | 6,171,574 Fr. |

The figures which follow are taken from the Report for the year 1913:-

| | <u>Fr.</u> |
|---|---|
| Capital at 31st Decr. 1913 | 370,948,000 |
| Cost of acquisition of land up to same date | 36,629,052 (or 17.730 Fr. per Kilometre) |

| | |
|---|--------|
| Percentage of Gross receipts derived from - Passengers and Luggage | 61.74% |
| Goods and Miscellaneous articles | 38.26% |

| | |
|---|--------|
| Ratio of Working Expenses to Gross Receipts | 71.84% |
|---|--------|

The Receipts per Kilometre open for traffic were:-

| | Passengers & Luggage. Fr. | Goods & Misc. Articles. Fr. | Total Fr. | Receipts per Train Mile. Fr. | Expenses per Train Mile. Fr. |
|-------------------------------|------------------------------|--------------------------------|--------------|---------------------------------|---------------------------------|
| "Passenger and Parcel" Lines. | 23598.64 | 598.77 | 24197.41 | 0.56 | 0.45 |
| "Passenger and Goods" Lines. | 3269.90 | 2026.14 | 5296.04 | 0.97 | 0.66 |
| General Averages | 4987.58 | 1905.53 | 6893.11 | 0.79 | 0.57 |

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For 145 lines in full operation

| | |
|----|---|
| 53 | yielded dividends in excess of the amount of the 3½% Annuities. |
| 15 | yielded " " " 3% |
| 21 | " " " 2½ to 3% |
| 16 | " " " 2 to 2½% |
| 40 | " " " less than 2% |

During the ten years ended 31st Decr. 1913 the average rates for dividend, for lines which had been in operation for at least 12 months, were as follows:-

| | <u>Per Cent.</u> | | <u>Per Cent.</u> |
|----------------|------------------|----------------|------------------|
| 1904 | 3.21 | 1909 | 2.80 |
| 1905 | 3.19 | 1910 | 2.88 |
| 1906 | 3.16 | 1911 | 2.76 |
| 1907 | 3.07 | 1912 | 2.84 |
| 1908 | 3.01 | 1913 | 2.82 |

The decline in the rate of dividend is no doubt attributable in part to the fact that the earlier lines constructed were those for which the demand was greatest and which held the greatest commercial possibilities. Another cause of the decline is probably to be found in the steady increase in the cost of land, labour and materials. That the Society itself was somewhat concerned at the outlook may be gathered from the concluding paragraph of their Report for the year 1913 in which, after quoting the figures given above, it was stated that great caution was being exercised with regard to schemes for the extension of the vicinal system and that such extensions should only be contemplated in future in cases where a considerable and expanding volume of traffic could be definitely anticipated.

F R A N C E.

(39) The history of railway development in France may be said to date from 1823. Concessions were granted at the outset to a few private undertakings, but the results were not encouraging and in 1839 the State resorted to a guarantee of interest in order to secure the completion of the line from Paris to Orleans. This system of guarantee won the confidence of investors and became at a later stage the recognised basis of French railway operation.

The really active stage of railway development was entered upon in 1842, the State undertaking to construct the earthworks, bridges, stations, etc. whilst the companies to whom concessions for the operation of the lines were granted were required to lay the rails, and provide the rolling stock - with the stipulation that the railways should ultimately revert to the State, when the rails and rolling stock would be purchased at a valuation. In 1851 the Companies' charters were extended to 99 years from that date.

It was subsequently found that the few trunk lines radiating from Paris, being securely possessed of a monopoly of the through traffic, had no inducement to construct and work branch lines for the development of the less remunerative local traffic; and in 1859 a distinction was made between the old network (ancien réseau) of main lines and the nouveau réseau of less profitable extensions. The Companies were invited to construct lines of the latter class under liberal Government guarantees of interest. If the new lines paid, the Companies bought out the Government, and, if they did not pay, the State was liable to fulfil its guarantee - an arrangement of which the chief advantage lay too obviously with the Companies.

(40) The Law of 1865 attempted to establish local lines independently of the great Companies, the local authorities being empowered thereby to advance money for the construction of cheap branch lines; but, being built on the standard gauge, the new lines tended to compete with the main lines. The financial results were disastrous and eventually most of these local lines were absorbed into the main line system.

(41) The Law of 1880 was framed for the purpose of reviving light railway development, the metre gauge lines constructed under this Law being distinguished by the title of "Chemins de fer d'intérêt local" from the main lines, or "Chemins de fer d'intérêt général." The former term includes tramways - the word "tramway" in French law referring to a line laid wholly or mainly on a public road.

(42) The expression "intérêt local" is applied to lines which affect the population of only one department, borough or district and serve the territory of one department at the most, whilst the railways of general interest usually traverse two or more departments, a department in France being roughly equivalent in point of size to the ordinary English county. The distinction is, in effect, territorial; it is not solely a question of gauge, for not only branch lines but even narrow gauge lines may be classed as lines of "general interest".

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Lines of local interest are not exempt from the general regulations which apply to the construction of all French railways, but in the specification for each such line (and these specifications are almost invariably in a standard form) special requirements may be prescribed in respect of gradients, curves, speed and other matters.

(43) Available information respecting the extent of light railway development in France varies appreciably, but the statements which follow afford approximate indications. At the end of 1906 the length of the lines of local interest (including private sidings) was stated at 9361 Km. in the Report presented to the Board of Trade by Messrs. Reyntiens and Chute in 1910.

In certain notes taken during the war by Lt. Col. G.H. Johnson of the Canadian Forestry Corps (Jura Group) the development of the system of "lignes d'intérêt local" was indicated by the following figures:-

| Year | Length in Kilometres, under construction or in operation. |
|------|--|
| 1866 | 232 |
| 1870 | 1814 |
| 1880 | 3679 |
| 1890 | 4089 |
| 1900 | 6725 |
| 1910 | 11669 |
| 1912 | 12651 |

In a separate table shewing the length of metre gauge Tramways under construction or in operation Lt.-Col. Johnson furnished the following figures:-

| Year | Under construction | In operation. |
|------|--------------------|---------------|
| | Km. | Km. |
| 1880 | 234 | 411 |
| 1890 | 451 | 1085 |
| 1900 | 2315 | 4231 |
| 1910 | 3279 | 8690 |
| 1912 | 2445 | 9713 |

The following table, furnished by Comte Vitali, an expert in matters relating to the construction and working of Light Railways in France, shows the length and gauges of the Light Railways in operation and in course of construction (or about to be constructed) in 1912:-

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| Gauge. Ft.Ins. | Power. | Nature of Services. | Kilometres. | |
|-------------------|-----------------------|-----------------------|-----------------------|---|
| | | | In Opera- tion. | Under con- struction, or projected. |
| 4 8½ | Steam. | Passengers and Goods. | 2,175 | 84 |
| -do- | -do- (Rack) | -do- | 3 | - |
| 3 11¼ | -do- | Passengers & Parcels. | 2 | - |
| 3 6 | Steam or Electric. | Passengers & Goods. | 7,800 | 2,247 |
| -do- | -do-(Rack) | Passengers only. | 12 | 4 |
| 2 7 7/16 | Steam. | Passengers & Goods. | 136 | - |
| 2 6 | -do- | -do- | 12 | - |
| 2 0 | -do- | -do- | 2 | - |
| Totals. | | | 10,142 | 2,335 |

These figures are said to be exclusive of "industrial" lines (234 Km. of various gauges) and also of Tramways carrying passengers and goods. The length of these Tramways is stated as follows:-

| Gauge. | In operation. | Under construction or projected. |
|---------|---------------|-------------------------------------|
| | Km. | Km. |
| 4'8½" | 123 | 213 |
| 3'6" | 6932 | 1998 |
| 2'0" | 345 | 1 |
| Totals. | | 7400 2212 |

The length of the main lines in operation in 1912 is stated at 40,731 Kilometres, whilst 2702 Kilometres were under construction or projected.

(44). By the Law of 1880 the control of the Chemins de fer d'Intérêt Local is vested on the Prefects of the Departments concerned, acting under the authority of - but without direct reference to - the Minister of Public Works. The various companies, however, have a right of appeal to the Minister against the decisions of the Prefects.

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The Minister delegates inspectors to ensure that the regulations affecting the safety of traffic are observed; and when annual subsidies are granted by the State in aid of a railway of local interest the audit of accounts must be carried out in accordance with regulations laid down by Ministerial decree.

There are instances in which Departments themselves have constructed local lines and supplied the rolling stock at their own cost, thereafter leasing the lines to contractors (e.g. the Decauville Company) to be worked by the latter on certain conditions; but it would now appear to have become more usual for the Company to which a concession is granted to provide a proportion (usually one-fourth) of the capital, and for the remainder to be provided by the Department.

(45) In a report submitted by the British Consul at La Rochelle (Mr. Warburton) in February 1895, it was stated that the Department borrowed the amount required at a very moderate rate of interest, which, during the first 50 years, would be in a great part paid by the Government annual grant, (see below) so that until the end of that period no serious inconvenience was likely to be left. At the same time the contractor advancing one fourth of the capital (and receiving interest thereon during the period of concession) was required to work as well as build the line - an arrangement which tended to obviate any serious loss in working.

(46) There is in France no National Society such as exists in Belgium, schemes being put forward by promoters; but the undertaking, when once it has been approved, is regarded as a work of public utility and the undertakers are invested with ample powers. At the expiration of the period of the concession - usually 90 years - the department which has granted it enters into possession of the line and all its fixed appurtenances. In the last 5 years of the period the department has the right to enter into possession of the line and apply the revenue to putting it into thorough repair. It has also the right to buy out the concessionaire at the end of the first 15 years, the net profits of the preceding 7 years being a governing factor in the calculation of the purchase price.

By the Law of 1880 the State may assist a local railway in any case where the gross receipts are insufficient to cover working expenses plus 5 per cent per annum on the construction capital - provided that at least equal assistance is rendered by the department or borough concerned, with or without the intervention of the interested parties. Where the latter takes the form of capital or works it is equated as an annual charge at the rate of 4% on a sinking fund basis.

The assistance afforded in such a case by the State, under Article 13 of the Law of 1880, takes the form of a subsidy made up as follows:-

- (1) a fixed sum per kilometre open to traffic; and
- (2) one-fourth of the sum necessary to bring the gross receipts up to a certain figure.

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In no case however, must the State subsidy increase the gross receipts beyond a specified amount per kilometre or enable more than 5% per annum to be paid on construction capital.

(47) In leasing the lines to the concessionaires the departments at first adopted a similar principle in fixing the remuneration to be granted to the working company; that is to say, the State and the department concerned guaranteed interest at a certain rate on the invested capital and, for working the line, the promoters received a fixed sum plus a part of the gross receipts - the State and the department guaranteeing that the amount of these receipts did not fall below a stated minimum.

It was subsequently found that under this system of guarantees the working companies felt little inducement to improve the services or to develop traffic, and efforts were accordingly made to devise formulae whereby the remuneration to be granted to the companies would be determined in such a way as to render them directly interested in the development of the traffic.

(48) Various formulae were devised with varying success, and eventually the method described below - which was substantially endorsed by such authorities as MM. Colson and Considère - was adopted as affording the most promising solution. Under this method the department concerned bore the entire capital expense, and the company worked the line at its own cost and risk. A fixed maximum amount for working expenses was laid down in the concession. If this maximum were not attained the Company received (as a premium) two-thirds of the difference between the actual expenditure and the maximum. If the gross receipts fell below the maximum fixed for working expenses the deficit was carried to a suspense account, and if the receipts exceeded the expenses the balance was applied in the first instance, to paying off - with interest at 4 per cent - any deficits already carried to suspense account. If any sum remained for disposal this was shared equally by the department and the working company.

In a particular case in which this method was adopted, in the department of the Loire, it was laid down that so long as the receipts per mile were less than £192 the maximum for working expenses should be fixed at the same figure. When, however, the receipts exceeded this amount the following formula (in English equivalents) came into play:-

$$W = £93 + \frac{1}{4}d T + 3d M + 0.30 R.$$

In this equation:

W = working expenses, i.e. the maximum to be fixed.

T = ton miles.

M = train miles.

R = gross receipts, after deduction of rates and taxes.

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In the actual case in point the maximum for working expenses was made up of a fixed sum of £93 per mile per annum, plus 4d per ton for goods carried over that mile, plus 3d per train mile over it, plus 30% of the gross amount earned thereon.

Experience showed however that the result of the adoption of such formulae was to throw added burdens upon the departments, and this in time opened the way in some cases to intervention on the part of the great companies, who had hitherto shown no inclination to take the lead in developing minor railway connections. The Northern Railway brought up some lines which could not pay their way, capital was advanced by the Northern and Eastern Railways and interest guaranteed by the Southern Railway to certain tributary lines. All the great lines afford junction facilities to light lines at moderate rentals; and, when working light lines, they sometimes take from the earnings of the latter only the actual expenses incurred and forgo any claim in respect of general charges or station rent.

(49) With regard to the procedure followed in connection with the grant by the Mayor of a Borough or by the Prefect of a Department of a concession for a railway of local interest, the following conditions are laid down in the Law of 1880.

Where it is necessary to construct a line in the territory of one or more boroughs the General Council of the department decide upon the route to be taken, the manner and conditions of construction and the necessary contracts, etc. for the working of the line. The conditions must confirm to the terms and conditions embodied in the "Cahier des Charges" approved by the Conseil d'Etat for lines of local interest.

In the case of a local railway to be constructed in the territory of one borough only, the powers granted in other cases to the General Council of the Department are exercised by the Municipal Council.

Plans for either "departmental" or "borough" railways must be submitted to the General Council of Bridges and Roads, and to the Council of State; and where a project has been decided upon by a Municipal Council the proposals must be accompanied by a statement of the opinion of the General Council of the Department.

If the scheme is approved the railway is declared to be "of public interest" and is authorised by law.

Where the concession is granted by the Department the Prefect must submit the plans for the approval of the Council; but the Minister of Public Works - on the recommendation of the Prefect and with the advice of the General Council of Bridges and Roads - may call upon the General Council of the department to discuss the plans afresh.

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The procedure to be followed prior to the grant of a concession for a line of local interest is also described by Comte Vitali. He states that no preliminary survey of the land to be traversed by a new line can be undertaken without a permit from the Minister of Public Works. After preliminary enquiry has been made as to the traffic likely to be carried on the line, the information obtained has to be submitted to the Minister with a map showing the proposed line of the railway. This request is submitted to and examined in the Department of Bridges and roads from the engineering, financial and commercial stand-points, and if the project is considered sufficiently sound the Minister sanctions the necessary preliminary survey. This (tacheometric) survey having been carried out a plan is prepared, on the scale of $\frac{1}{2000}$, showing every building, road, river, drain, etc. affected, and any peculiarity of the ground crossed by or in the neighbourhood of the line.

The project is then made the subject of an "administrative enquiry"; and incidentally the Ministry of War must be consulted. In the course of the administrative enquiry the views and claims of the local residents (e.g. with regard to the location of stations) are ascertained and considered. Then follows the definitive survey and the preparation of estimates and of a list of the owners of the land to be taken. The complete plans, estimates etc; are then submitted (a) to the Superior Council of Bridges and Roads, for examination from the technical standpoint (b) to the Consultative Committee of Railways which examines the scheme from the commercial and technical points of view and with special reference to the relations between the main railways and feeder lines, and (c) to the Council of State which acts as a sort of legal adviser to the Government. Then, if the length of the line be less than 20 Kilometres, the scheme is finally sanctioned by a Presidential Order, or - if the length of the line be 20 Kilometres or more - by an Act of concession.

Wherever possible, lands required for the purposes of a light railway are acquired by private treaty, but where this is not practicable compulsory powers are exercised.

(50) The Cahier des Charges relating to a concession for the construction and working of a local line fixes definite periods within which the work of construction must be commenced and completed and also the date by which it shall be ready for opening to traffic.

(51) The document also specifies the plans, sections and descriptive memoranda which must be submitted by the concessionaire. The "general" plans, shewing the lay-out of the line and the earthworks, sites of stations, etc., have to be submitted to the Prefect of the Department concerned who - after consultation with the Engineer-in-Chief of the Department - submits them to the Conseil General for approval. The "detailed" plans are approved by the Prefect except in cases where watercourses and main roads are affected by the proposals. In these cases the Prefect must submit the detailed plans to the Conseil General for approval.

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(52) The concessionnaire is held liable to construct a second track at his own cost if and when the receipts from the undertaking reach a certain figure; and, even when this figure is not attained, he may at any time during the period of the concession be required by the Prefect of the Department or by the Minister of Public Works to construct and work a second track on the condition that the cost of construction shall be repaid to him. If in either case the construction of the double line is not begun and completed within a specified time the administration may carry out the work itself.

(53) The Cahier des Charges also prescribes the gauge to which the line and rolling stock are to be constructed, the width and depth of the ballast, the minimum radius of curves, the maximum gradient and other such details.

(54) The number and positions of the proposed stations and goods yards, etc., are subject to the approval of the Conseil General, and the positions of any additional stations subsequently provided are subject to like approval after they have been agreed upon between the concessionnaire and the Department concerned.

(55) The number, extent and sites of sidings are determinable by the Prefect who may during the period of operation require the construction of new sidings and also the extension of existing tracks at and in the immediate vicinity of stations.

(56) Before the work of construction is commenced the concessionnaire must submit to the Prefect detailed plans of every Goods yards, siding, station and Halt, together with plans and elevations of all buildings, accompanied by a descriptive memorandum in support of the proposals.

(57) Where the Railway crosses a road the width and height of the openings, etc., in the viaduct are determinable by the Minister of Public Works or by the Prefect, as the case may be, and a similar provision is made in respect of cases where the railway is carried under public roads.

(58) Level crossings over roads must be constructed in such a way as not to impede the passage of wheeled traffic. The Prefect decides, on the proposition of the concessionnaire, the type of barrier to be provided and also determines in what cases huts or Guard-houses shall be established. In the case of unfrequented roads he may dispense with any of these protective arrangements if he sees fit.

(59) Where water courses are affected by the construction of the railway the concessionnaire must see that alternative courses are provided. The width, etc., of viaducts over rivers etc., is defined in the Cahier and the administration may insist upon the provision of a carriage road or of a path for pedestrians, the excess cost thus incurred being borne by the State, the Department or the communes, according to circumstances.

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All viaducts, bridges etc., must be constructed of masonry or steel, excepting in cases where the administration may rule otherwise.

The weight of the rails to be used and the maximum distance between the sleepers are specified in the Cahier des Charges.

(60) The railway must be separated from adjoining property by such fencing, etc., as the Prefect may approve. Under the Law of 1880 the concessionaire may be allowed to dispense with fencing etc., in certain cases, but special reasons must be shewn for this:-

- (a) In populous areas.
- (b) In Sections contiguous to roads.
- (b) In approaches to level crossings, and
- (d) In the vicinity of stations.

(61) All lands (other than roads) required for the construction of the line must be purchased by the concessionaire unless the authority granting the concession undertakes this liability itself. The concessionaire must bear the cost of making good all damage done to land or buildings during the progress of the work.

Whilst the work of construction is proceeding he is invested with all the rights which existing law or regulations confer upon the administration in the matter of public works, e.g. for the expropriation of land, etc.

In the Frontier zone and in Military areas the concessionaire must observe certain special formalities and conditions in the planning and execution of the works.

In cases where the railway crosses land conceded for mining operations the Minister of Public Works determines what measures must be taken to prevent mutual interference as between the railway and the mining undertaking, and he also decides what measures are necessary in cases where quarry land is to be crossed or tunnelled under.

(62) The work of construction is carried out under the control and supervision of the Prefect acting under the authority of the Minister of Public Works, and it is stipulated incidentally that the traffic on public roads must be interfered with as little as possible and that all danger points shall be suitably lighted and guarded at night.

When the works have been completed the necessary permission to throw the line open for traffic is given by the Prefect.

(63) With regard to maintenance it is stipulated that the railway and its appurtenances must be kept in good condition, the cost of all repairs and renewals being borne by the concessionaire. Where he fails to keep the line in good condition the Prefect can have the necessary work carried out at the cost of the concessionaire.

(64) The dimensions of the rolling stock are determined with reference to those of the loading and structure gauges. The locomotives must consume their own smoke and otherwise satisfy the conditions laid down by the administration with regard to locomotives generally.

Passenger coaches must satisfy all the conditions applicable to railway passenger vehicles and definite provision is made in the Cahier with regard to seating accommodation, lighting, heating, etc., The number of classes for which passenger accommodation shall be provided is also stated.

The Prefect has a right to determine the number of brake wagons or coaches to be included in the trains, and the minimum number of trains to be run in each direction daily is laid down in the Cahier itself. The maximum speeds to be observed on different sections of the line, the time per journey to be occupied and also the timetables are subject to the Prefect's approval. It is laid down also that all engines and coaches, wagons, etc., must be kept in good condition by the concessionnaire.

(65) The Cahier defines the duration of the concession and provides that at the expiration thereof the Department shall enter into all the rights of the concessionnaire and shall become entitled at once to all the receipts of the undertaking. The concessionnaire is bound to surrender the line in good condition, together with all buildings, stations, workshops and the like. During the last five years of the period of the concession the Department may appropriate the receipts and use them for the purpose of restoring the line to good condition if the concessionnaire has not fulfilled his obligations in this respect.

(66) With regard to the rolling stock, workshop equipment, etc., the Department reserves to itself the right to take these over either wholly or in part, the value thereof being paid to the concessionnaire. The latter may require the Department to take over all fuel, stores, etc., at a valuation; and, conversely, the Department may require the concessionnaire to transfer these in the same way, but the Department is not obliged in any case to take over any stores in excess of the quantity which may be necessary for the operation of the line for a period of six months.

(67) The State may purchase a railway of local interest after the expiration of fifteen years working, the price to be paid being based upon the amount of the net receipts during the previous seven years. In making the calculation the net receipts of the two least profitable years are deducted from the total and the average of the net receipts for the other five years of the period is ascertained. This amount is then payable to the concessionnaire in the form of an annuity during the remaining years of the period of the concession, but in no case must this annual payment be less than the amount of the net receipts during the last of the seven years taken for the purpose of calculation.

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(68) The State may also purchase a line before the expiration of 15 years of working, and in that case the purchase price is fixed by arbitration.

(69) If the operation of a local railway is suspended, either wholly or in part, by the concessionnaire the Prefect is empowered to take the necessary steps to ensure the provision of a temporary service at the cost of the concessionnaire, and if, within three months thereafter, the concessionnaire cannot resume operation the Minister of Public Works may cancel his concession.

(70) A schedule of the rates and fares chargeable by the concessionnaire is embodied in the Cahier des Charges; and, excepting where the Prefect may rule otherwise, every passenger train must afford sufficient accommodation in each class for all passengers desiring to travel thereby. The maximum weight of passenger luggage which may be carried free is specified, and it is also laid down that goods of any kind not specifically mentioned in the tariff may be provisionally "classed" by the concessionnaire, subject to the subsequent approval of the administration.

(71) Stipulations are also made to ensure promptitude in the despatch and delivery of goods and the avoidance of delay to passenger services. In this connection it is provided that Troops and Military or Naval material shall have priority of treatment.

(72) Accommodation must be provided in every train for mails and postal staff and the postal administration has the right to fix a posting box to each train and to install such "mail catching" apparatus as may be required. Accommodation required for postal work at stations must also be provided.

The Telegraph and Telephone apparatus required for signalling purposes must be provided by the concessionnaire as directed by the Minister of Public Works, subject also to the approval of the Minister of Posts and Telegraphs. The Government reserves to itself the right to erect Telegraph and Telephone lines along the railway and to deposit telegraph and telephone material on railway property so long as this does not interfere with the requirements of the undertaking itself. The concessionnaire must provide, at the request of the Minister of Posts and Telegraphs any space required for the construction of Telegraph and Telephone offices.

(73) Broadly speaking the policy of the French Government with regard to local railways has been one of State aid, coupled with a reservation of appreciable powers of control, whilst the more immediate control and, to a great extent, the ownership of the lines is placed in the hands of the local authorities. The intervention of the State and Local Authorities in the construction and operation of local lines in France rests no doubt, as it does in Belgium, upon the theory that transport is a matter of

national concern and that the indirect advantages which accrue to industry and to the population as a whole are a sufficient warrant for the expenditure of public monies on the provision and working of local railways and tramways even in cases where ordinary considerations of profit and loss would rule such projects out of court.

In his report of February 1895, to which reference has already been made, H.M. Consul, Mr. Warburton, suggested that the rapid extension of the local railway and tramway system in France was mainly to be accounted for by the ease with which public money could be obtained in that country and to the political efforts of the various local Deputies and Senators to secure the grant of State subsidies for their own constituencies. He contended that this had led to the execution of many projects of doubtful wisdom and that, in the majority of cases, there was no sort of proof that the "indirect" advantages obtained were sufficient to justify the construction of the lines.

In his treatise entitled "Light Railways at Home and Abroad" Mr. W.H. Cole suggests that this expression of opinion should not be too hastily accepted and reminds his readers that Mr. Warburton's point of view was that of the average practical Englishman who was naturally disposed to regard with scepticism any undertaking which was not financially self supporting. It is significant, however, that M. Hanoteaux himself at that time (1894) considered the question to be so controversial as to preclude him from pronouncing any definite judgment on the subject; and, whilst M. Considère endeavoured to prove that the indirect gain accruing from the provision of light railways might be taken as the equivalent of 6 times the amount of the gross receipts, M. Colson doubted whether the operation of such lines had any appreciable effect upon the national wealth.

(74) The working of railways of local interest is, of course, marked by its simplicity. For instance, at the date of the publication of Mr. Cole's book (1899), women were frequently employed. The examination of stock on running trains was not enforced. Block instruments and telegraphs were unnecessary; the lines, being single, might be worked by staff. Turntables might be dispensed with. The length of trains was limited to 16 vehicles, but a buffer vehicle between the engine and the first passenger coach was not required. If a train were fitted with continuous brakes no special brakeman on the last vehicle was required, or a fireman on the engine. The usual minimum service consisted of three trains daily in each direction, with a subsidy for extra trains. Stations and approaches had not to be lighted till a few minutes before the arrival of evening trains.

(75) The speed of the trains is naturally low, being usually under 18 miles per hour. The issue of tickets is frequently entrusted to the train staff, as is also the work of switching at points.

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(76) With regard to construction, the majority of the local lines have adopted the 1 - metre gauge. The rails commonly weigh from 40 to 50 lbs. per yard and are fixed to sleepers laid on ballast of broken stone, gravel, etc. To a great extent the lines are laid along the sides of public roads, but for certain sections land must be acquired. Curves of small radius and steep gradients are allowed, the maximum gradient usually allowed being about 3 in 100. The provision of fencing, and of gates at crossings, is only resorted to in special circumstances. The average cost of construction of local lines, according to figures available for the years 1904, 1907 and 1911, was then between £4000 and £5000 per mile. A brief description of a few individual local lines is given below.

(77) The Caen-Dives-Luc line was built and equipped by the Decauville Company under a concession granted in 1890. The gauge is 2 feet, the line is 24 miles long and the cost of construction worked out at about £2143 per mile. The track is laid mainly along the side of the public road, and where diversions from the road were necessary the land required was obtained free of cost. The traffic is mainly "agricultural" - passengers, goods and farm produce - and the smallness of the gauge and the portability of the permanent way make temporary extensions to farms, etc., easy. The rails, weighing 30 lbs. per yard, are fixed by rivets to sleepers weighing $24\frac{1}{4}$ lbs. and the track is laid in sand ballast topped with gravel and stones.

The curves are sharp, the radius in one case being only 65 feet and the gradients are as steep as 1 in 33. All the passenger stock and most of the goods stock run on bogies. The brakes are automatic. Apart from special vehicles for live stock, two types of goods wagon are employed, one carrying 5 tons on two axles and a larger wagon weighing $3\frac{1}{4}$ tons and carrying a 10-ton load.

There were (in 1899) 15 stations; some with sheds only and others with a small office provided, two running sheds and a repairing shop.

(78) The Pithiviers-Toury line was constructed by the Department concerned to encourage the cultivation of beet and the manufacture of sugar and the working was leased to the Decauville Company. The line is 19 miles long, with 7 intermediate stations and a few other stopping places at which passengers may be picked up. The track is laid on one side of the public road, from which it is not separated in any way. The gradients are usually about 1 in 100. At each station is an open passenger shed, and a parcel office containing a weighing-machine. The tickets are issued by the conductors on the trains.

The rails weigh about 19 lbs. per yard and are riveted to steel sleepers laid on 6 inches of ballast. In 1899 there were two goods engines weighing 9 tons empty and 12 tons full, and 2 passenger engines weighing 7.2 tons

empty and 8.5 tons full. Apart from a cattle truck, the wagons were of two types (a) 5-ton four-wheelers and (b) 10-ton open bogies weighing 3.17 tons. The cost of the line was £1,223 per mile, or (including equipment) £1,551 per mile. Important branches had been laid down by cultivators and manufacturers.

(79) The Dijon-Mereboe Steam Tramway (metre gauge) has a length of 28 kilometres and is laid mainly at the side of the public road with a stone kerb between it and the portion used by road vehicles. The rails weigh 50 lbs. per yard and the sleepers are laid on ballast of broken stone. The speed limit is 20 km. per hour and the maximum axle weight is 7 tons.

No fencing is provided, there are no signals at points, and no protective gates or bars at road crossings.

(80) The Beaune-Semur line in Cote-d'Or is laid partly on roads and partly on land acquired at a cost of between 1 and 2 francs per square metre. The gauge is 1-metre, and the rails, which weigh about 48 lbs. per yard, are laid on ballast of broken stone 3 inches deep. The sharpest curves have a radius of 45 metres in the villages and of 60 metres elsewhere.

The heaviest engines have a weight of 27 tons, hauling 80 tons at a speed of from 10 to 15 km. per hour. Lighter engines are also used hauling a load of 50 tons. Each train is made up of an engine and 4 or 5 vehicles. Telephonic communication is provided between the stations.

(81) The Amiens-Beauchamps (1-metre gauge) line is 40 kilometres long. The rails weigh 44 lbs. per yard and are laid on oak sleepers. For the first $1\frac{1}{2}$ miles the narrow gauge rails are laid between the normal gauge rails of a main line. The maximum speed allowed is 45 kilometres per hour. The sharpest curve has a radius of 100 metres, and the steepest gradient is 1 in 50.

No fencing exists, except where the landowners concerned may have provided it. Notice boards are provided at some of the road crossings, but gates are unusual.

The trains are worked on the staff system, and there are no signals at passing loops. Telephones are provided at the stations.

The normal train is made up of the engine, 3 passenger coaches and one van. The weight on the driving axle of the engine is 6.8 tons.

(82) The Pontarlier-Mouthe (Doubs) line, particulars of which have been supplied by Lt. Col. Johnson, serves an agricultural and forest area and, apart from passengers, carries a considerable traffic in the shape of farm produce and timber. The line is constructed on the 1-metre gauge and, in 1912, the length in operation was 30 kilometres. The average speed of the trains, including stops, is 15 km. per hour.

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In 1912 the average number of trains daily was 6, the annual train movement being as follows:-

| | No. of Trains | No. of Train Kms. run. |
|---|---------------|------------------------|
| Passenger and "Express" Goods (Mixed) Trains | 2176 | 65,098 |
| Freight only, including Ballast Trains | 29 | 616 |
| Total number of trains | 2205 | 65,714 |
| Engine kilometres run ... | 66,030 | |

The number of passengers carried during the year was 80,265 (in two classes) and 17,720 tons of freight were dealt with, the number of ton-kilometres run being 367,742.

Five locomotives were in use, having minimum and maximum weights of 18 and 24 tons respectively and the rolling stock comprised 8 passenger cars (each seating 32 or 34 persons), 32 freight cars weighing 3.9 tons and capable of carrying a load of 10 tons, and 2 other vehicles.

The total number of persons employed including administrative staff was only 57, or 1.9 per kilometre.

(83) With regard to the financial results obtained from the working of lines of local interest (including tramways), the following particulars may be of interest.

In 1894 the construction capital on account of local railways had reached £13,250,000, the gross receipts were £720,000, and the net revenue only £120,000. Tramways, or light railways on public roads, added £2,750,000 capital, £200,000 gross receipts, and only £40,000 net revenue. The State had to pay £132,000 and the Departments £224,000, in the shape of guarantees on these local Railways and tramways, and it was considered by railways experts at that time, that, in view of the considerable additions which would be entailed to liabilities already serious, extensions should not be actively encouraged. In the "Reports from H.M. Representatives Abroad on Light Railways" (Commercial No. 9, 1894), while the light lines of only one French Department (Charente Inferieures) are examined in detail, an unfavourable view is taken of the financial position of all French light Railways.

(84) A group of five local lines in the Landes District, aggregating 100 miles in length, cost £3,200 per mile, and the interest and sinking fund on a capital of £320,000 demanded an annual charge of £18,000, of which the Southern Railway, which had given a guarantee of 5 per cent of the capital, had to make up £11,000. The lines were opened in 1891. In 1893 the gross receipts were £18,000 (about £310.0 per mile per week), the working expenses £11,000 (£2.3.0 per mile per week), and the net earnings £7,000 (£1.7.0 per mile per week).

(85) The most recent statistics obtainable relate to the operations of the Société Générale des Chemins de fer Economique, a company which works over 2,200 Kilometres of light lines in France (or, inclusive of concessions authorised, 2,667 Kilometres). In the Report for 1916, it is shown that the average receipts totalled 6,554 francs per Kilometre, an increase of 2,125 francs compared with 1915 and 2,286 francs more than 1912. It is explained, however, that the growth was mainly due to increased military traffic. The total gross receipts were 13,373,528 francs, an increase of 3,994,840 francs. The expenditure had also increased, partly owing to special provision for staffs. By the working of these lines, the National Treasury benefited by over 2 million francs, partly in direct taxation, partly in services rendered.

(86) The following particulars of traffic, receipts, etc., have been taken from Mr. Colson's book and relate to the years 1901 and 1902. They relate to the whole system of local lines, and in extracting the figures all amounts stated in francs have been converted to pounds sterling at the rate of 25 francs to the £. The figures for 1901 are as follows:-

| Lines having a "petite vitesse" service: | No. of Units carried (in Gross Receipts. millions), £ | | |
|---|---|------------|---------|
| | Passengers | 36 | 760,000 |
| Goods | 7 | 520,000 | |
| Other Receipts ... | - | 160,000 | |
| Lines without a "petite vitesse" service: | | | |
| Passengers | 754 | 3,840,000 | |
| Total. | | 25,280,000 | |

In respect of the year 1902 the following figures were given:-

| | |
|---|-------------|
| No. of Kilometres in operation | £10,700 |
| Cost of Construction | £50,640,000 |
| Gross Receipts | £5,760,000 |
| Working Expenses | £4,480,000 |
| Net Receipts | £1,280,000 |
| Advances claimed in respect of Guarantees of Interest | £ 320,000 |

The last item refers only to lines having a petite vitesse service and represents the amount of the charge falling upon the State, i.e. the amount (at least equivalent) of the subventions borne by the localities is excluded.

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(37) From another statement reproduced in M. Colson's book it appears that, during the period 1876 to 1902, the cost of the construction of local lines had risen steadily whilst the proportion between the Net Receipts and the Capital Cost had gradually decreased.

With regard to the Pontarlier - Mouthé line, described by Lt. Col. Johnson, the financial position may be gathered from the following figures quoted for the year 1912:-

| | |
|---------------------------------------|---|
| No. of Kilometres in operation | 30 |
| Capital Expenditure per Kilometre ... | about £2372 |
| Receipts | " £5727 |
| Expenses | " £5163 |
| Gross Profit | " £ 560, or about £16; 13/- per kilo- metre. |

The receipts were derived from passengers, etc., in the following proportions:-

| | |
|---------------------|----------------|
| Passengers | 51.5 per cent. |
| Goods | 47.1. " |
| Miscellaneous | 1.3 " . |

The Expenses worked out at about 90% of the Gross Receipts, the receipts and expenses per train kilometre being 2.18 francs and 1.97 francs respectively.

(38) As an indication of the extent to which the financial position of different local railways may vary, the following figures may perhaps be added. They refer to 3 lines of 2-foot gauge in North Western France having a considerable traffic both in goods and passengers. They relate to the year 1913:-

| No. of Engine Kilometres run. | Receipts. Fr. | Expenses of Operation. |
|----------------------------------|------------------|------------------------|
| | | Fr. |
| (a) 151683 | 344572.31 | 218504.88 |
| (b) 172235 | 290053.61 | 229626.14 |
| (c) 333028 | 341452.39 | 376210.84 |

It will be observed that whilst the excess of receipts over expenses in the first of these cases is very marked and in the second case quite considerable, the balance in the third instance is actually on the wrong side. The reason for this disparity is not quite clear, but an examination of the relative returns indicates that in the third case the receipts from passenger and goods traffic (per engine kilometre run) were disproportionately low whilst the charges for maintenance of track and of buildings etc., were abnormally high. In the absence, however, of fuller information as to the particular circumstances and conditions affecting the construction and operation of each of the three lines it is difficult to draw any definite conclusions in the matter.

G E R M A N Y.

Note:- The statement which follows has been compiled mainly from books and documents dated 1894-1899. Information of recent date is lacking, and it seems probable that the activity displayed by the Imperial Government during the 15 years preceding the war in matters affecting industry, commerce and military development has led to many changes. It is possible, on the other hand, that in the domain of railway construction, operation and control, the ordinary considerations of finance and of social and economic advantage were more than ever subordinated to military conceptions during this latter period and in that case, the lessons (if any) to be learnt from recent practice in Germany may have to be accepted at something less than their face value.

(89) In the early days of railway development, Germany consisted of numerous and practically independent States. As a consequence no common policy was followed and each State sought to meet its individual requirements without reference to neighbouring areas.

The small States adopted the principle of State ownership and railways were constructed to serve "local" interests even in cases where this could not have been justified on ordinary business grounds.

In Prussia, where the "national" idea found a wider scope, the State intervened at the very outset. In 1842 State aid was granted in the form of guaranteed interest, with a right reserved to take over the lines after the lapse of a certain period. From 1848 onward the construction of lines and the buying up of rolling stock by the State proceeded steadily; and, although after 1870 the smaller States of the new Empire resisted Bismarck's attempt to establish an Imperial State system, Prussia itself (including Alsace-Lorraine) became a complete example of state railway ownership. The majority of Prussian railwaymen were Civil Servants and the system was organised for political and military, no less than for business, purposes.

(90). With regard to the smaller States, the Imperial Government confined itself to matters of general regulation and supervision,

An edict of 1878, dealing with local railways, recognised three standard gauges (1.435, 1 and .75 metres respectively), limited the speed of trains, laid down less severe restrictions as to operation and gave local authorities power to relax these restrictions still further with the approval of the Imperial Government. In some cases ordinary railways were actually "disclassified" for the express purpose of taking advantage of the simplification and economy of working thus rendered possible.

By the law of 1875 these local lines were either remunerated for the carriage of Imperial mails or were altogether relieved of this duty, which the great lines had to discharge gratis.

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Germany.

(91) Prussian, as distinct from Imperial, legislation respecting secondary railways is noteworthy. In 1879 the Prussian Government acknowledged generally that such lines required financial aid and less stringent rules of working, but the Government did not define these rules in any precise enactment. During the next few years several secondary lines were constructed, some under concessions but the majority by the State, and similar action taken in other German States. These secondary lines (*Neabenbahnen*) were of the same gauge and the permanent way was of the same description as that of the main lines, but a lighter rail was used and the regulations as to working were less stringent. In train running they were limited to a maximum speed of 25 miles per hour.

Light Railways (*Kleinbahnen*) in Prussia were more particularly defined and regulated by the law of 1st October 1892. At that date there were in Prussia 83 light railways, including 37 of standard and 35 of metre gauge. Four years later, 129 new lines had been sanctioned under the law of 1892 and of these 76 were in operation and the remainder under construction.

The law in question placed the light railways under the control of the Department of Posts and Telegraphs, and the financial aid afforded by the State, the Provinces and the Communes in the interests of agriculture and forestry led to a rapid development. The State was empowered to lend £650,000 for the purpose, and by January 1897, over £350,000 of this sum had been advanced or earmarked for advance.

(92) The authorities in the Provinces also rendered support, in various ways and under various conditions, to public bodies or private persons desirous of promoting light railway undertakings. The conditions imposed and the degree of control to be exercised in respect of construction and operation were left to be determined by the Provincial Governments. These also determined, subject to confirmation by the Imperial Government, the conditions under which public roads might be used and also the safety precautions to be taken.

The form and extent of the assistance rendered by the different Provincial and Communal authorities in the construction of light railways varied considerably; but on one point they appear to have followed a common principle. They did not themselves undertake the construction of the lines but confined themselves to supporting such undertakings on the part of other public bodies or private persons.

(93) There were three principal methods by which such support was given:-

By (1) Preliminary Works:- In East Prussia, Hanover, the Rhine Province and the Department of Wiesbaden the preliminary works (earthworks, etc.) were carried out by the Provincial authorities on condition that the projectors bound themselves, inter alia, to repay half of the expenditure incurred.

By (2) Direct financial assistance, given in four different ways:-

(a) Hanover, Saxony, Rhine Province and Schleswig Holstein granted loans.

In Hanover two-thirds of the total capital was lent at 3% interest on condition that not less than 1% was set aside annually by way of sinking fund. If the undertaking concerned yielded a net profit, this was appropriated by the Province to raise the rate of interest or increase the sinking fund allowance.

In Saxony capital was lent to districts or to companies in accordance with the advice of the Provincial Committee.

The Rhine Province lent the whole capital at 3% interest plus a further 1% per cent. for sinking fund, any net profit being utilised to raise the rate of interest to 3% per cent and - if a surplus still remained - to increase the allowance for sinking fund also.

Schleswig-Holstein lent one-fourth of the original capital sum required, exclusive of the cost of land. In this instance the loan was free of interest but was conditional upon the establishment of a sinking fund.

The Province of Westphalia empowered its Committee to lend capital without laying down any special conditions.

(b) East Prussia paid a proportion, not exceeding 1 1/2%, of the interest payable by the contractors on the capital actually employed, such contribution not to continue for more than 43 years. There was the further proviso that the annual expenditure of the Province under this head should not exceed £750. Saxony undertook to contribute up to 4 per cent., for interest and sinking fund, on condition that the Province should rank before all other shareholders.

(c) Silesia contributed a free grant, with the sole condition that this should be repaid if the profits of the line concerned should prove sufficient for the purpose.

Schleswig-Holstein - besides the loan referred to above - granted a free contribution up to one-eighth of the original cost, on condition that if the undertaking were sold the Province should receive a proportionate part of the sale price.

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(d) Pomerania, Brandenburg, Posen,
Westphalia and the Department of Wiesbaden
took shares in light railway undertakings.

(94) Most of the Provinces laid it down as a condition of their assistance that the district authorities should assume some sort of responsibility in respect of the undertakings in their areas.

By (3) Facilities for use of Roads, - Free use of the public roads was granted by Brandenburg to light railways of a "generally useful" character and by Saxony to all such railways.

The Rhine Province demanded no payment for the use of the roads unless the railway concerned earned a net profit exceeding 6 per cent. Where the net profit exceeded this figure the Province claimed 20 per cent, of the excess.

In East Prussia and Posen no payment was required for the use of roads already existing, and even in other cases payment could frequently be avoided.

(95) In a communication made by the Imperial Government to the British Embassy at Berlin in 1894, it was stated that, the light railways of Germany appeared in general to be well adapted to the development and improvement of agriculture, forestry and the like, and particularly to the opening up of new markets and the carriage of manures and raw produce over a wide area.

(96) In the official Report on German Railways submitted by Messrs. Pearson and Reytiens in 1908 reference was made to an "Order" issued in August 1898 by which the "Kleinbahnen" in Prussia were divided into two classes:-

- (a) "Strassenbahnen" (street railways) including all municipal tramways and similar undertakings, and
- (b) "Nebenbahnhiliche Kleinbahnen" comprising lines which, in size and manner of construction, etc., approached more closely to the importance of "Nebenbahnen".

The mileage of these lines in 1907 was said to be (a) 2526 kilometres and (b) 7905 kilometres.

It was also stated that many of the "Kleinbahnen" were the property of towns and municipalities, State ownership of such lines being limited as a rule to those cases in which they were appurtenances of State-owned "Nebenbahnen".

It was further stated that concessions for "Nebenbahnen" were granted by the Minister of Public Works; whilst those for "Kleinbahnen" were granted by the District

Governor after consultation with railway administration, this course being necessary as it was for the Minister to decide in each case whether the railway should be classified as a "Klein" - or as a "Nebenbahn".

(97) With regard to financial assistance by the State, Messrs. Pearson and Reytiens stated that at the date of their Report this was not of wide application and, in Prussia, was practically confined to "Kleinbahnen". By the law of 8th April 1895 a special fund was constituted for this purpose.

The following extract from their Report indicates the conditions upon which State aid might then be granted:-

"The following general conditions are laid down as to cases in which the State may grant financial assistance, viz:-

1. That the railway must serve general public interests, that is to say, not merely serve the passenger traffic between large towns and their suburbs, nor the interests of a few specific trades.
2. That the cost of the railway must be in proper proportion to the economic advantages to be derived.
3. That without financial assistance from the State the construction of such railway would not be possible.
4. That interested parties gratuitously give the necessary land for the construction of the line, or hand over the requisite means for its acquisition, and further that the local authorities also come forward with assistance.

The assistance of the State as a rule must be confined to the taking up of ordinary shares, and also of preference shares if issued simultaneously. The granting of loans must only take place when special considerations render this form of assistance desirable, and contributions "a fonds perdu" only in very exceptional circumstances, and then only to a moderate amount. The guaranteeing of interest is entirely debarred."

As regards the fulfilment of the stipulations mentioned above, so far as the second one is concerned, the conditions will only be complied with, if, after the first difficulties of working have been overcome, the receipts are sufficient to cover the expenditure and to show a prospect of paying at least moderate interest on the capital. If the latter is not the case, then each application must be considered on its merits.

The applications for assistance must be approved by the Ober-Präsident (Governor of the Province) who must supply to the deciding authorities all necessary information, especially as regards the character and importance of the undertaking, the capital and the manner in which it has been subscribed, the traffic and revenue to be expected, and the financial standing of the promoters.

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In support of their application for assistance, the promoters must submit full plans and details of the preliminary works, together with the cost of the same. In order that an opinion may be formed as to the revenue-producing capacity of the line, estimates of traffic, both passenger and goods, with the data on which they have been compiled, must also be submitted.

Information must be given as to what traffic may be confidently expected in the first few years after the line is open for working, and in addition a list of the proposed rates and fares for passenger and goods traffic must be supplied.

Financial assistance by the State is usually dependent on the stipulation that in the capital on which the net annual profit is apportioned, the cost of the acquisition of land is only included in so far as approved by the "Regierungs-President", who must, however, first obtain the consent of the Minister of public works".

(98) In spite, however, of the rapid growth of population in Germany, the development of local railways carrying goods was in that country much slower than in France. In 1910 the total length of the lines in operation was 5,900 miles with a capital outlay of £24,800,000, of which the States had contributed £8,000,000.

(99) With his report of December 1874 H.M. representative in Berlin (Lord Granville) furnished a list of the 37 lines in Prussia which appeared to fall within the category of "light" railways. These had a total length of only 480 miles, but the list did not include those narrow gauge lines which—although they might fairly be regarded as "light" lines were legally treated as ordinary railways. These were apparently included in the figures already quoted in para 91 of this memorandum.

In Lord Granville's list are found gauges of 4' 8 $\frac{1}{2}$ " 1 metre, 2' 11 $\frac{1}{2}$ ", 2' 7 $\frac{1}{2}$, 2' 4 $\frac{1}{2}$ " and 1' 11 $\frac{1}{2}$ ". Eighteen of these lines were of the widest gauge, but those having the narrowest gauge (1' 11 $\frac{1}{2}$ ") possessed the greatest mileage. For gauges narrower than the standard the Prussian law of 1892 recommended the metre, the 0.75 metre (2ft. 5 $\frac{1}{2}$ in.) and the 0.60 metre (1ft. 11 $\frac{1}{2}$ in.), the narrowest gauge being largely adopted for military purposes.)

(100). The list furnishes some interesting figures of cost. The actual cost of the Stolp-Rathsdemitz line, 11 miles long, 4 ft. 8 $\frac{1}{2}$ in. gauge, opened in 1894, is not given; but, so far as the date go, it appears to be £2,582 per mile. The line from Bromberg Station to the cattle market, 2 miles long, 4 ft. 8 $\frac{1}{2}$ in. gauge, opened in 1893, cost £1,590 per mile. The Stralsund-Barth line, 41 miles long, metre gauge, opened in 1894, cost £2,393 per

mile. The Bromberg light railways, 56 miles long, 1 ft. $1\frac{1}{4}$ in. gauge, were estimated to cost £1,626 per mile. The estimated cost of the Wilkovo light railways, $34\frac{1}{2}$ miles long, 1 ft. $1\frac{1}{4}$ in. gauge, was only £848 per mile.

(101) The capital for the lines given in Lord Granville's list was provided by the contractor, the province, the district, and the parties concerned, either separately by one, or jointly by two, three, or all four. In most instances the contractor supplied the money. Referring to the lines already mentioned, it may be noted that the capital for the line from Stalp to Rathsdemitz was provided, in practically equal amounts, by the province, the district, and parties concerned; that for the line from Bromberg to the cattle market, the Bromberg light railways, and the Wilkovo light railways, by the contractor

(102) With regard to the results of the working of light railways in Germany Mr. Cole emphasised the difficulty of obtaining useful information; but, quoting from the journal "Engineering", he stated that in 1894 certain light lines having a total length of about 500 miles - mainly narrow gauge - earned gross receipts of £400 per mile, and paid from 2.2 to 2.5 per cent. on capital outlay. On the Bavarian light railways in 1893 the gross receipts were £106,601, and the expenses £55,588, or 50.26 per cent. on gross receipts of only about £5 per mile per week. These Government light railways were all of standard gauge, 4' $8\frac{1}{2}$ ", to take main-line goods wagons, but were under separate management; about two-thirds of the traffic were goods; and the method of working was extremely economical. As a particular instance the case of the Rath-Groding railway may be cited. This (standard gauge) line was opened in 1888, cost £2,888 per mile for construction and £269 per mile for rolling stock. Thirty men (1.23 per mile) were employed, the total receipts were £3,842, or only about £3 per mile per week, and the line was worked at a cost of £2,636, or 68.6 per cent. of the gross earnings.

(103) According to figures of a later date (1904) the average cost of light lines in Prussia was £4180 per mile and the average earnings £310 per mile.

(104) As already stated with regard to the working of German light lines generally, the States could - with the approval of the Imperial Government - relax the regulations considerably.

Accordingly, at speeds of less than twenty-seven miles an hour, a buffer compartment (instead of a buffer vehicle) might be sufficient between passengers and engine; even for omnibus trains on main lines the conductor might have sole charge of the train, sell tickets at stopping places where no staff was kept, and look after luggage; the driver and stoker, who worked the engine, might also grease the carriages; women might be employed as gate-keepers; temporary men might be taken on without the usual qualifications; fencing need not be continuous; gates at level crossings might not be required; trains might halt between stations; the telegraph and road-bell signals might be dispensed with; fixed (not only distant, but even main)

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signals might not be considered necessary; facing points might not even have point-indicators; the stoker might be dispensed with on the engine; mixed trains would, of course, be permissible; trains, being ordinarily limited to 120 axles, might be pushed if they did not exceed 50 axles, with a man in the leading wagon, and at a speed not exceeding nine miles an hour; authorised station-masters might not be required at stopping places; and the brakes on vehicles (excluding those on the engine and tender) might be one axle in every 12, 10, 8, 7, 5, or 4 on inclines of 1 in 500, 300, 200, 100, 60 and 40 respectively.

(105). The following brief descriptions of two light railways visited by representatives of the Great North of Scotland Railway in 1896 may be of interest, although it is not certain how far the information then obtained still holds good.

(a) The light railway from Mugeln to Geising-Altenburg in Saxony, 23 miles long, is of .75 metre (2 ft. 5½ in.) gauge. The rails are flat-bottomed and weigh about 51 lbs. per yard. The line is laid on land acquired for the purpose, this land being in some sections adjacent to the public roads. Fencing is not provided and many of the road crossings are quite unprotected. Sidings to factories and mines are numerous. The points at the sidings are opened and locked by a key which is carried by the train guard. He also issues the tickets and collects the fares and weights parcels and goods at the stations.

A certain number of mixed trains are run, but as a rule the passenger and goods trains are kept distinct. The longest train has 25 vehicles. The weight of the engines, including coal, is 25 tons, and the speed limit for passenger trains is 25 km. per hour.

At Mugeln transhipment takes place to normal gauge wagons. Both the normal and the narrow gauge rails run into one goods shed and have a platform between them, the narrow gauge rails being raised so that the wagon floors reach the same level. This shed is used for the transhipment of general merchandise. Coal and heavy goods are transferred in a yard where the narrow and normal gauge lines run parallel, 5 ft. apart. The transfer of goods is done by contract. In 1896, 180 tons were transferred daily at Mugeln, the cost of transhipment working out at about 2½d. per ton for general goods and 2d. per ton for coal, etc.

At the date mentioned the line was not paying more than 1% as against an average return of 4½% for all the railways (standard and narrow gauge) in Saxony.

(b) The Landsberg to Schongau light railway in Bavaria has a length of 28.7 km. and is of normal gauge. The rails weigh about 48 lbs. per yard. They are flat-bottomed, and are laid on longitudinal sleepers of the same length; they are kept to gauge by ¾" iron tie rods, 3 to each 9-metre length of rail. The maximum axle weight allowed is 10 tons.

No fencing is provided and there are no gates at level crossings. The points at stations and sidings are provided with disc signals worked in conjunction with the points.

The staff includes one driver and four firemen, and two of the latter relieve the driver as circumstances may require. Five traffic men are employed, one to assist in the loading of goods and the preparation of invoices, etc., one on the train to issue tickets and collect the fares, one as a pointsmen, one in the office at Schongau and one as a "relief" man. The working hours in 1896 were 12 daily, including 2 hours off for meals.

At the stations buildings are provided, but no regular station agent is employed; the duty of receiving and dealing with goods being discharged by a man who attends for half an hour before and after the arrival and departure of each train; the number of trains is six daily. The loading and unloading of goods is either paid for by the traders concerned or is carried out by their own employees.

(106) It should perhaps be added with regard to private railways in Germany - and the bulk of the "Kleinbahnen" fall in this category - that the policy of the State has been to prevent competition between them and the State-owned lines, and the purchase of lines for absorption into the State system has always been conducted with the object either of removing existing competition or of preventing possible future competition.

In purchasing railways the State has also been guided by a desire to secure promising investments, with the result that the lines which still remain in private hands possess neither the one nor the other qualification for State absorption. It cannot be said, however, that of late years the purchase of private railways has caused any elimination of competition, as owing to the State Control, the tariff system on the private lines has been practically identical with that on the State railways. The passenger tariffs on the private railways differ to a slight extent, which varies according to the financial state of the Company. Some latitude in this matter is allowed in those cases where the lines serve purely local interests.

(107) With regard to the wages paid on private lines there has been some diffidence on the part of existing Companies in divulging information as to their rates of pay. It is gathered, however, that the difference between the rates on the private lines and those on the State railways is slight, at any rate in the lower grades.

Uniform is not supplied free to the staff of the German State Railways, but on the private lines the cost of uniform is borne by the Companies.

A U S T R I A .

(108) Although a general railway law existed in Austria as early as 1838 and although, during the decade which followed, the State not only constructed railways but assisted others to do so by guarantees of interest, the attitude of the Austrian Government to railway development generally was not at first sympathetic. In the period following 1848 - when the State purchase of existing lines was actively proceeding in Prussia - the Austrian Government were selling their lines, and selling them badly, to private Companies. The failure of Austria in her wars with France and Prussia (1859 and 1866) - which was soon to be partly due to the backward condition of her railway system - was followed by a period of reckless speculation and led the Government in 1873, to decide upon a policy of State ownership and management so far as the National Exchequer would allow.

From time to time railways of a lighter description than the ordinary main lines were constructed, under particular laws, at the cost partly of the State and partly of private promoters: and to lines of this kind the term "Localbahnen" was first applied officially in 1875.

Hitherto the secondary lines connecting districts with the main line had been styled "Nebenbahnen"; and the new title of "Localbahnen" was designed to embrace these branch lines and also all other lines of a secondary character as well as lines in a third (tertiary) rank which were designed to serve interests of a more narrowly local character.

(109) By the law of May, 1880, enacted in response to popular demand, further provision was made for the construction of local lines, even without direct assistance from the State. By this law the Government were authorised to afford all possible faculties with regard to concessions for and the construction and working of local lines and also to relax certain regulations in respect of rates, time-tables, speed and other such matters. The law also exempted local lines from certain regulations respecting postal services and from Government inspection of working; it allowed the State roads to be used without payment on condition that the portions of roadway occupied by the lines were kept in repair; it exempted the Companies from liability for ground taxes for a period of 30 years, from all duties usually assessable in connection with the formation of Companies and the issue of shares and also from any new tax which the State might levy during the ensuing 30 years.

Under the stimulus of this law local railways were at first freely constructed; but, as the financial results obtained from the working of some of the new lines was unsatisfactory, private capitalists became disinclined to adventure the necessary funds, and the promotion of new lines had to be stimulated afresh by the law of 1887. By this enactment free junction facilities were afforded to local lines connecting with main lines worked and guaranteed by the State, and a joint user of main line stations was granted free of charge. If the promoters of a new local railway were unable to raise the necessary capital, the State was authorised either (a) to grant a fixed subsidy, or (b) to find a proportion of the capital required, or (c) to undertake the working of the line subject to the proviso that the local authorities bore an equal share in the undertaking. Further,

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the laying of local railways on State or other public roads was made subject to less severe restrictions. On the other hand, it was provided that the State lines should have the right of using a normal gauge local line without prejudicing thereby the right of the Government to purchase the latter under the provisions in the Act of Concession.

(110) Existing railways, willing to adopt the inferior classification and to work at lower speeds, could also be admitted to the privileges conferred by the new law; and where the speed on the local line did not exceed 28 Kilometres (17½ miles per hour) large economies in staff, equipment etc., could be effected.

State aid might take the form of subsidies in cases where the Provinces, Communes and private persons contributed a reasonable share of the cost of new local lines; or it might be rendered by a grant of land or by materials for construction, or of guarantees of gross or net revenue; and a State main line might work a branch for less than the actual cost involved in such working, the State reserving the right - on payment of toll - of running State trains over the branch line.

(111) Between 1880 and the date of the new law upwards of 87 local lines were constructed with a length of 2,399 Kilometres (1491 miles) and between 1888 and 1893, under the law of 1887, 45 local lines with a length of 1195.6 Kilometres (743 miles) were added to the system. Many of the local lines in Austria are of standard gauge, but a considerable proportion of the total mileage is 2' 6" gauge (0.76 metre or 29.92 inches), and instances of the metre gauge also exist.

In 1890 the Diet of Styria took the lead by raising a loan of 2833,333 for the construction of local lines in cases where such a line was acknowledged to be a public interest and the promoters were unable to provide the necessary capital. If the fund were to be drawn upon, either the State or the interested parties, or both together, supplied one-third of the necessary construction capital either as a lump sum or as share capital and guaranteed interest at 4 per cent together with three-eights of the amount set aside for the re-payment of capital. The working of these provincial lines was to be undertaken, if possible, by the administrations of the main lines with which they were connected in return for a payment equivalent to the actual working cost; otherwise the working would be undertaken by the provincial Administration owning the line.

The application of the law was entrusted to a mixed Commission, representative of official and commercial interests.

In 1892, the Diet of Bohemia passed a similar law, which provided for the contribution of subsidies by means of a guarantee of interest and sinking fund.

The Galician Diet followed, in 1893, with a law based upon the idea that the construction of light railways should be left to private enterprise and that assistance should only be given after a minute examination of the scheme concerned. With this object a Provincial Railway Office and Railway Council were established to examine the scheme put forward, to supervise the execution of the works and,

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generally, to undertake the oversight of all light railway projects. The Diet decided to provide in each annual budget for a period of 30 years commencing with 1894 a sum of 225,000 to be utilised in subsidising light railways. The Galician National Bank at the same time promised to assist towards the creation of a special loan fund, from which loans for the construction of light railways could be granted. These loans, which were not to exceed £1,250,000 in the aggregate, were to be in the form of railway bonds issued by the railway with a Provincial Guarantee, no such loan being made by the Bank without the consent of the Diet except in the case of railways whose net dividend was guaranteed by the State or by the Province.

(112) As already indicated, the Austrian Government embarked in 1873 upon a definite policy of nationalisation; and at the close of the year 1906 the mileage of the State railways, and of private railways worked by the State, formed about 68 per cent of the total mileage of all the railways in Austrian State territory. Of the "Lokalbahnen" in particular about 71.5 per cent of the mileage was worked by the State, the figures for the year 1896 being as follows:-

| Local lines worked by the State | | | State Lines (leased. (Worked by Private Companies). | Private Lines worked by Private Companies. |
|---------------------------------|---------------|----------|---|---|
| State Lines. | Private Lines | Total | Km. | Km. |
| 1340.022 | 4434.114 | 5774.136 | 29.641 | 2268.077 |

Of the lines referred to in the last column, 1409.033 Km. belonged to "independent" Companies, the remainder (859.044 Km.) being in the hands of the Hauptbahnen, i.e. main lines.

(113) In their Report to, the Board of Trade (1909) Messrs. Pearson and Reyntiens stated that the Austrian railways owned by the State were by no means entirely constructed by the State, considerable purchase of private lines having been made at one time or another; and it is presumed that this statement referred not only to private Hauptbahnen but to a certain number of Lokalbahnen also. Such purchases were usually effected by negotiation and amicable arrangement based in each case on the conditions of the Concession.

In many cases the original Concession stipulated that on and after a certain date the State should have the option of purchase on certain conditions (a) that the State should pay to the Company the average of the results of the best five

of the last seven years, either half-yearly for the remainder of the period of the Concession or in the form of a capitalised sum; or (b) that the Company should receive 5 per cent on the "Anlage" capital, either in half-yearly payments or in the shape of a capital sum. The date on which the State might exercise the option to purchase varied in different cases; the earliest concessions were granted for a period of 50 years, whilst in later concessions the period of duration was 90 years - but the option of purchase might be exercisable at the expiration of the first 25, 30 etc. years of the Concession.

(114) At the date of the Report presented by Messrs. Pearson & Reyntiens further concessions for "Hauptbahnen" were thought to be no longer probable as the construction of any new Lines of this class was being undertaken by the State; but concessions for new "Lokalbahnen" were apparently still being granted by the Emperor on the recommendation of the Minister of Railways - the consent of Parliament being required in the case of guaranteed or State-aided lines.

These concessions were granted subject to the terms of the Railway Concession Law of September 1854 and other later enactments. The principal provisions of the Law of 1854 may be summarised as follows:-

Sanction for the preliminary work had to be obtained from the Minister for Trade, Commerce and Public Buildings in conjunction with the Minister of the Interior and the Minister for War. Applications for this sanction had to be accompanied by a plan shewing the route of the projected line and stating the time within which the preliminary works would be commenced and completed. The application for the concession for construction had to shew, inter alia, (a) that the preliminary work had already been sanctioned, and (b) in what manner the necessary funds were to be raised. The application had to be accompanied by a plan of the whole undertaking with all necessary details and an estimate of the cost.

It was laid down that at the expiration of the period of Concession the entire railway land and buildings should revert gratuitously to the State, the Company, however, remaining owners of all equipment used exclusively for transport purposes. At the same time the Company was required to hand over the Railway and its appurtenances in good condition.

The Company were accorded the right of expropriating land where this was necessary for the construction of the line.

Passenger and Goods tariffs had to be submitted for Ministerial approval and were subject to revision every three years, the paying capacity of the line and the tariffs of adjoining railways being taken into consideration. The scale of charges had to be published, and, if the net profits exceeded 15 per cent of the capital, the State might exercise the right of reducing the tariffs.

It was laid down also that Postal consignments and the officials accompanying them should be carried free and that Military, and Military stores, should be conveyed at the rates chargeable on the State lines. The Company was

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held liable to make suitable arrangements for the exchange of traffic, etc., with adjoining railways, subject to a power of adjustment remaining in the hands of the Minister. The Company had also to permit of the erection of State telegraph poles, wires etc., on the property or to allow the State the free use of the Company's telegraph apparatus.

No Company was allowed to raise a loan or issue shares without the sanction of the Government. If the orders of the Authorities were repeatedly disregarded, or if the conditions of the Concession, Working Regulations, etc., were contravened the Minister could order the sequestration of the Railway at the risk and account of the Company.

(115) The foregoing paragraphs may be taken to embody the main principles on which Concessions were based, but the variations in individual cases were naturally numerous.

In the case of "Lokalbahnen" the Concession usually included provision for a guarantee. In a typical case quoted by Messrs. Pearson & Reyntiens the State guaranteed that the Company should receive a sum which would enable it to pay 4 per cent on its capital and to write off its debentures, subject to certain limitations. Should the net income of the Company exceed the annual guaranteed sum, then the Company had to repay out of this excess all sums which the State might have paid, together with interest thereon.

The Company were required to deposit caution money in order to ensure the completion of the line within the period fixed by the Concession and also to ensure that the standard of construction set forth in the Concession was complied with.

The right of expropriation granted to the Company was extended so as to apply to land required for the construction of private sidings approved by the State. The manner of construction of the line was made subject to regulations issued by the Minister of Railways under whose supervision the work was to be carried out, and all contracts for construction and for the supply of materials had to be submitted to the Minister.

The amount of the real and nominal capital had to be approved by the State and, if any additional works or equipment should be found necessary, the cost of such might be added to the Capital account subject to the approval of the State Administration.

It was further provided in this typical Concession that the Line should be worked by the State for account of the Company during the whole period of the Concession, the costs of the administration and working of the Line to be paid by the Company by a lump sum to be mutually agreed upon.

The State reserved to itself the right to acquire the railway at any time after the date of opening, subject to the following conditions:-

- (1) That the State should take over the debentures referred to in the Concession and any other unredempted debentures subsequently issued with

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the consent of the State and that the State should pay to the Company a sum equal to the amount of the share capital existing at the time of purchase.

- (2) That, after the payment of the sums mentioned in the foregoing Clause, the State should take possession of the undertaking including all movable or fixed materials, e.g. rolling stock, stores etc., and should also take possession of any existing reserve funds and floating cash.
- (3) That due notice should be given to the Company of the date of purchase, and of the sum which the State would pay to the Company in respect thereof.
- (4) That the State should have the right to appoint a special inspector to ensure that the property of the Company was not allowed to deteriorate to the detriment of the State; that any alteration or charge on any of the Company's property after the date of declaration should be approved by the inspector; and that no fresh liabilities should be incurred without his consent.

At the expiry of the Concession the State was to be entitled to take possession of the entire undertaking of the Company free of charge, the latter retaining only such property as was not connected with the railway.

Finally, the State reserved to itself the right to cancel the Concession if the Company failed to fulfil the duties laid down in the Concession or by law.

(116) The extent to which the Lokalbahnen of Austria were assisted by the State and the Provinces respectively is disclosed by the following tables extracted from the Report of Messrs. Pearson & Reyntiens. The figures refer, apparently to the year 1906:-

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PARTICIPATION OF STATE IN "LOKALBAHNEN".

| | Guarantee for a Capital of | Taking up of Shares amounting to | Payments "a fonds periu", etc. |
|--|-------------------------------------|-------------------------------------|--------------------------------------|
| | | Ordinary Preference | |
| 1. Independent "Lokal- bahnen"- | Kr. | Kr. | Kr. |
| 1. Worked by State for account of proprietors. | 196,407,000 | 34,084,400 | 1,970,000 |
| 2. Worked by private Railway for account of the proprietors. | 10,790,000 | 3,760,000 | 150,000 |
| 3. Worked by them- selves. | 900,000 | 1,880,000 | - |
| 4. Worked by the State for its own account. | - | 2,100,000 | - |
| TOTAL | 208,097,000 | 41,824,400 | 1,970,000 |
| | | | 150,000 |
| II. "Lokalbahnen" which have become the property of the State. | 15,766,000 | 2,900,000 | - |
| Gross Totals | 223,863,000 | 44,724,400 | 1,970,000 |
| | | | 150,000 |

PARTICIPATION OF PROVINCES IN "LOKALBAHNEN"

| | Guarantee for a Capital of | Taking up of Shares: amounting to | | Payments "a fonds perdu", &c. | |
|--|----------------------------------|--------------------------------------|------------|-------------------------------------|--|
| | | Ordinary | Preference | | |
| 1. Independent "Lokal- bahnen" | Kr. | Kr. | Kr. | Kr. | |
| 1. Worked by State for account of proprietors. | 115,858,550 | 19,555,800 | 366,000 | 921,000 | |
| 2. Worked by pri- vate Frys. for account of the proprietors. | 26,501,300 | 3,920,000 | - | 3,865,893 | |
| 3. Worked by them- selves. | 4,900,000 | 732,000 | 2,800,000 | - | |
| 4. Worked by the State for its own account. | - | 300,000 | 300,000 | 4,328,954 | |
| TOTAL | 147,259,850 | 24,507,800 | 3,466,000 | 9,125,847 | |
| 11. "Lokalbahnen" which have become the property of the State. | 3,008,000 | 300,000 | - | 820,000 | |
| Gross Total. | 150,267,850 | 24,807,800 | 3,466,000 | 9,945,847 | |

NOTE: The Krone in 1909 was stated to be worth 10d. in
British currency.

Appendix K.
Austria.

(117) The total length of "Lokalbahnen" in operation at the end of 1906 was 7670.997 kilometres, more than one half of which was open to traffic during the ten years from 1896 onward.

On the total length open in 1906 the "independent" lines accounted for 5746.673 kilometres. The bulk of this was operated by the State for account of the owners, a part was worked by private Railways for account of the owners and a part by the "independent" concerns themselves. The remainder (about 180km.) was worked by the State for its own account.

The rest of the local lines were the property of the State or of Private Hauptbahnen and had an aggregate length of 1924.324 kilometres, the bulk of which was owned and worked either by the State or by private Hauptbahnen.

Of the total length of 7670.997 km. quoted above, 86.53 per cent was of normal gauge and 13.47 per cent of narrow gauge construction.

(118) Apart from the "Lokalbahnen" Messrs. Pearson & Reyniens allude to the existence of 34 smaller lines ("Kleinbahnen") having, in 1906, a total length of only 540 km. open to traffic. It was added, however, that this type of line had only been inaugurated in 1894 and that the development had been fairly rapid. None of these "Kleinbahnen" were owned by the State or by the principal private "Hauptbahnen", nor did the State participate in the Capital. Twenty-eight of the lines were worked by the proprietors, the remaining six lines (about 50 km. in all) being worked for account of the proprietors - one by the State and five by private Railways.

The expended "Anlage" capital of all the "Kleinbahnen" amounted to about £9,080,126 (taking the Krone at its then value of 10d.) or about £16,815 per kilometre.

(119) With regard to the Control of Railways in Austria, the State Railways were placed under the control of the Minister of Railways in 1896.

The Financial control is in the hands of the State Financial Department whose Budget is prepared in conjunction with the Railway authorities. The executive control is decentralised and rests in the hands of 13 local "Direktions".

The control of the State over Private Railways is extensive and covers construction, maintenance, the type and quantity of the rolling stock, the passenger and goods tariffs, the time-tables, etc., and in the case of guaranteed lines a large financial control is also exercised. In the case of subsidised lines the budget must be submitted to the authorities, by whom a careful check on expenditure is maintained.

(120) There is a wide interchange of running powers between the State and Private Lines, the payments in respect of the interchange being made upon a fixed basis in which account is taken of the interest on capital, the expenses incurred for supervision and maintenance, administration expenses, and also all expenses arising from accidents involving damage to persons, rolling stock, goods etc. The total of the expenses thus taken into account is divided between both parties in proportion to the number of axle kilometres run by the two Administrations.

(121) An Advisory Council was established in Austria in 1897 for the purpose of advising the Railway Ministry on general economic questions affecting Railways, the members of the Council being representative of Commerce, Agriculture, Mining, etc. A proportion of the membership is nominated by the Ministers of Commerce, Finance, Agriculture and War.

(122) With regard to the financial results obtained on State and Private Railways, Messrs. Pearson & Reytiens found it difficult to attempt any comparison. They instead two Private Lines which yielded a return of between 4 and 7 per cent, and a third Line serving a colliery district which returned from 11 to 13 per cent. In another case, however, (The Southern Railway Company), the return for the years 1902 to 1906 was nil.

With regard to the State Railways figures were given shewing that the percentage on the "Anlage" Capital was 2.22% in 1903 and had risen steadily to 3.01% in 1907.

In the case of the Private Lines comparison was said to be out of the question. Construction costs and the expenses of maintenance and working were governed by widely varying geographical conditions. The control of the State in the matter of expenditure and tariffs, and the assistance rendered by the State in many cases, made comparison doubly difficult. In addition, there was an absence of definite information as to the method of computing working expenses.

In the case of the State Lines also the percentages quoted above were said to be likely to give a wrong impression as they bore no relation to the cost of the purchase money or to the dividend responsibilities which were assumed by the State when private lines were purchased. Further, the operations of the State in railway matters had been influenced by National and Military considerations; the cost of construction and maintenance was high and both State and Private Lines were suffering from heavy expenses in respect of wages and materials.

At the date of Messrs. Pearson & Reytiens' report the Revenue of the Finance Department shewed a deficit and although it might be argued that the trade of the country had been greatly benefited by the low price of transport, additional revenue was certainly required.

The condition of the Lines and the supply of rolling stock, etc., evidently left much to be desired and the general supervision of private Lines was said to have been much more strictly enforced towards the end of the period 1901-1910. During that period the "Nordbahn" was nationalised and when the line was being acquired it was found that heavy expenditure was necessary for the renewal of rolling stock, etc.

Appendix K
Austria

(123) For the purpose of fixing rates for freight on Austrian Railways goods were classified under the heads of "fast" and "slow" goods. In the first category there are three sub-divisions whilst the second comprises nine different classes, to three of which "special" tariffs are applied. Apart from the Classifications described there are also definitely "Ausnahme" (exceptional) tariffs on each line. In the case of local railways these "Ausnahme" tariffs are usually divided into three classes.

The object of "Ausnahme" tariffs is to prevent competition.

- (a) between two or more railways with respect to tariff to or from the same district;
- (b) with water and road traffic;
- (c) for the purpose of securing traffic for a special port;
- (d) between several districts of production for specific district of consumption.

They are also designed to counteract disadvantages of geographical situation and to assist agriculture and other industries.

Where unforeseen or sudden emergencies have to be met and the procedure involved in fixing "Ausnahme" tariffs would be too protracted, there is yet another type of tariff employed, known by the title of "Refaktien" or Rebates.

Export rates, designed to further the development of the export trade of the country are granted either in the form of "Ausnahme" tariffs or "Refaktien". With import rates it is different, special import rates being very rare: the ordinary rates for internal transit are usually applied to imports. As with goods tariffs so with passenger tariffs, the schemes adopted are not uniform. In many cases the zone system is adopted, whereas in others rates are charged on the kilometric distance. On the principal "Lokalbahnen" the fares are calculated in zones of 10 km. each portion of 10 km. being considered as 10 km. The rate per 10 km. is graded inversely according to the distance travelled. The basic rates are fixed in respect of slow passenger and mixed trains; the express fares are somewhat higher.

In the case of a typical "Lokalbahn" quoted by Messrs. Pearson & Reyntiens the unit rates per person per kilometre by slow and mixed trains, including the 6 per cent ticket tax levied by the State, were as follows:-

| <u>Class</u> | <u>Fence.</u> |
|--------------|---------------|
| First | .954 |
| Second | .636 |
| Third | .424 |

The minimum fares charged for each class were 8d., 5d., and 3d., respectively. In the case of the "Kleinbahnen" the ticket tax is reckoned at 3d per cent only, and those "Kleinbahnen" which serve the traffic of a Rural District and its immediate surroundings within a radius of 10 km. from the boundary of the district are exempt even from this tax.

(124) All stations in Austria are "closed", i.e. access to the platform can only be obtained by persons holding either ordinary, or platform tickets.

Luggage porters must be paid by the passengers, but the payment is governed by a scale of charges officially announced by the Railway.

(125) Workmen's tickets are issued on all the Austrian lines, the relative regulations being practically the same in each case. These tickets are issued only to those who possess a certificate to the effect that they fall into one or other of the classes of work-people who are entitled to the benefit of the special fares. Workmen's tickets are not available by fast or express trains, and as a rule the outward journey must be completed and the return journey commenced before certain specified hours. The ordinary season ticket system is in force in Austria, but the regulations with regard thereto vary on different lines. In some cases they are issued in the form of books containing 40 coupons. Scholars' monthly tickets are issued for distances up to 50 km. and are intended to be used exclusively for the purpose of attending schools recognised by the public authorities.

(126) Excursion fares in the English sense of the term only apply to a limited extent, e.g. for parties of a guaranteed number and by trains running in connection with special public events.

Messrs. Pearson & Reyntiens stated in their report that return tickets were formerly issued at 20 per cent less than the sum of two single fares, but that except in a few rare cases the issue of return tickets had been abolished and that, even where it still lingered, twice the single fare was charged.

Appendix K.

Hungary.

H U N G A R Y.

(127) The construction of local railways ("Vicinal-Bahnen") in Hungary began about 1860, when the Government settled the principles which should govern the construction of "secondary" lines with a standard gauge and of "tertiary" lines of narrow gauge. The establishment of these lines was effected under special regulations, partly by the State and partly by private persons benefiting therefrom: but these regulations did not prove so effective as had been expected. The demand for special light railway legislation was accentuated by the marked development of agriculture and forestry and by the fact that the public roads were either inadequate or in bad repair; & continued pressure by the municipalities, district authorities and private persons led to the enactment of the laws of 1880 and 1888 and to a relative ordinance of the Minister of Communications dated 11th March, 1884.

These laws, or this ordinance, formed the basis on which the local railway system of Hungary was definitely established and developed.

(128) The laws of 1880 and 1888 provided for financial co-operation between the State, the Municipalities, the district authorities and private persons and encouraged the construction of local railways generally. Under these enactments a concession for a local line might be granted in an Ordinance by the Minister of Commerce for a period of 50 years, the right of pre-emption being reserved; and, apart from the provisions described below, local lines were allowed a 30 years exemption from all direct and indirect taxes. The laws in question also provided that

- (1) Where a local line served property in the hands of the State, the latter would contribute to the cost of construction.
- (2) The Minister of Commerce might grant a subsidy for a period of 50 years in return for the carriage of mails, but subject to the proviso that the subsidy when capitalised at 5 per cent should not exceed 10 per cent of the actual cost of constructing the line;
- (3) In respect of the subsidies to be granted by the Minister of Commerce the annual State budget might be debited with a sum of £25,000;
- (4) The State Railways should carry materials for the construction of local railways in return for actual out-of-pocket expenses;
- (5) The State should supply engines and iron and steel materials to local lines on long credit and, at a moderate rental, rolling stock to those local railways which the State might work;
- (6) The State railways and State-guaranteed private lines should be bound to take over, if so desired, the working of any local lines connected with their own, on condition that they should receive compensation if the actual working expenses were not covered;

- (7) The Minister of Commerce might refuse to allow the opening of a local line in any case where those benefiting therefrom had not contributed at least 25 per cent of the original capital. (The municipal and district authorities might also contribute, and might levy special taxes for this purpose):
- (8) The Minister of Commerce might require the working of a local railway to be handed over to the line with which it connected, if the latter were a State-owned or a State-guaranteed concern;
- (9) The actual construction capital should be fixed by the Act of Concession - the nominal capital, the method and conditions of subscription, the kinds of stock to be issued, the dividends and fixed interest and other cognate matters being settled by the Minister of Commerce;
- (10) That the maximum rates should be fixed by the Act of Concession, the State reserving the right to demand a reduction of the rates if the net profit of a line for 3 consecutive years should amount to 7 per cent per annum on the original construction capital.

Finally, a ministerial ordinance of April, 1889 fixed the regulations concerning the construction, equipment and plant of standard gauge local lines.

(129) The following extract from a report of October 1894, addressed to the Foreign Office by H.M. Representative at Budapest, gives a concise account of the means by which local lines at that date were financed and of the extent to which the State and local authorities co-operated with each other in this connection:-

The capital necessary for the construction of secondary railways has, as a rule, been obtained by private enterprise, to which, however the State, the Municipalities, the parishes, and others have contributed, either in fixed amounts, in subsidies, or by offering some guarantee according to their interest in the railway to be constructed. Such contributions have been made in exchange for ordinary shares, or "a" fonds perdus"

The State also remunerates such railways for carrying the mails, either by yearly payments of certain amount in proportion to the services actually rendered, or by arranging an annual average sum payable for a certain series of years.

These annual payments are usually capitalised and discounted by a bank.

There are also instances of Municipalities guaranteeing the yearly payment of interest and the quota of amortisation of the debentures issued by such railways.

The Companies formed for the construction of such railways usually issue ordinary shares, which must represent at least 35 per cent of the actual building capital. The balance is then represented by preference shares or preference bonds (debentures).

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The total of the contributions to the actual building capital of such railways represented, at the end of 1892, 33.2 per cent of that capital, out of which the State contributed 13.3 per cent, including 5.6 per cent for carrying the mails (capitalised), 7.5 per cent being contributed by the Municipalities, and 12.4 per cent by the parishes and from other sources.

It might be of interest to notice that the contribution of the State to the actual building capital of the secondary railways amounted at the end of 1892 to 17,167,680 florins (about £1,430,640) for which the State has received ordinary shares of the nominal amount of 14,772,190 florins (about £1,231,015) whereas the balance of 2,395,490 florins (about £199,625) was given "à fonds perdus".

The contributions of the Municipalities amounted at the end of 1892 to 9,583,442 florins (about 2799,036), of which about 25 per cent were given "à fonds perdus", and the balance in exchange for ordinary shares.

The secondary railways are managed independently by the Companies themselves, or by the State railways on the basis of contracts.

Such railways cannot be looked upon as paying undertakings for the present, especially for the holders of ordinary shares.

It must, however, be considered that the ordinary shares are for the greater part held by the contributors who have the greatest economical interest in the construction of the lines, owing to the facilities of communication thereby obtained, and to the consequent increase in the value of their estates.

As to the State contributions, they are counterbalanced by the increase of the traffic of their own lines, as well as by the general economical development to be expected in the districts through which the secondary lines pass.

(130) The mileage of local lines open in 1888 was 1144 (1831 Kilometres). Official statistics in 1892 shewed a total mileage of 2326 (3722 Kilometres) of which little more than 5 per cent was on a narrow gauge - 0.76 meter or 2 ft. 6 inches, the remainder being on the standard (1.435 metre) gauge.

In 1893 the mileage amounted to 2333, or 3733 Kilometres.

(131) The mileage figures for 1888, 1892 and 1893, quoted in the foregoing paragraphs have been taken from Mr. W. H. Cole's book, the railways referred to being variously described as "local" lines, "Vicinalbahnen", and "Secondary" lines.

These figures, however, are difficult to reconcile with those furnished by Messrs Pearson and Reintiens in their Report. Under the heading of "Lokalbahnen" they state that the total lengths open in 1887 and 1896 were 2,200 km. and 2,314 km. respectively. Possibly the system of "Lokalbahnen" referred to in their report may include some lines which do not differ greatly from the main lines in point of construction, etc., and which Mr. Cole (dealing with "light" railways in particular) may have decided to exclude. The absence of any clear definition of the terms used in such cases is a fruitful source of confusion.

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(132) In Messrs Pearson and Reynstien's Report the "Lokalbahnen" of Hungary are said to correspond to the "Nebenbahnen" of Germany - which are of the nature of feeder lines, do not form parts of through routes and are not subject to such stringent regulations in the matter of construction as the ordinary main lines. The distinction between the "Lokalbahnen" and "Hauptbahnen" in Hungary was said to be much more marked than in Austria, the cost per kilometre of the former being only 88,416 kronen (£3,684), as against 294,518 kronen (£12,272) per kilometre for the main lines.

(133) At the same time Messrs Pearson and Reyntiens refer to the still smaller class of lines known as "Kleinbalmen" which were created by a Law of December 1894 to serve distinctly circumscribed areas. These lines were said to be of different gauges and to include "street" lines, etc.

The figures of mileage quoted below were given under the head of "Localbahnen" and are presumably exclusive of the length of the "Kleinbahnen". They shew the number of kilometres open in Hungary at the close of 1906 and are as follows:-

| | |
|--|-----------|
| Existing State Lines | 354,755 |
| Private lines (18) worked by proprietors | 1209.200 |
| Private lines (19) worked by other private Companies | 731.316 |
| Private lines worked by the State - For its own account (5 lines) | 298.257 |
| For account of Proprietors (2 lines) | 69.391 |
| On payment of actual cost (105 lines) | 7546.775 |
| Total | 10209.694 |

In another part of the Report the total length of all the "Lokalbahnen" was stated as 10623 km. Possibly this larger figure may have included about 414 km. in respect of "Kleinbahnen". If not, it may have been taken from returns later than those of 1906.

(134) Concerning the lines (2326 miles) referred to by Mr. Cole as being in existence in 1892, it was stated that these figures included 60 local lines representing - with 5 other lines then under construction - a capital of \$10,696,430. Of this amount the State contributed 13.3 per cent., the Municipalities 7.5 per cent and the Districts, etc. 12.5 per cent, making a total contribution of 33.2 per cent from public sources. The remainder (\$7,138,777) represents the large extent to which private investors participated. The standard gauge lines in this group cost \$4.124, and the narrow (3'6") gauge lines \$3,394 per mile; but in making any comparison of costs it is to be borne in mind that, where any of these local lines were worked by a State Railway, the latter usually furnished the rolling stock.

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(135) of the 60 lines in question 442 $\frac{1}{2}$ miles were worked by the local undertakings themselves, 142 miles by the private main lines of which they acted as branches or connections and the remaining 1741 $\frac{1}{2}$ miles by the State Railways either (a) at the expense of the local enterprise or (b) at the expense of the State Railways, or (c) as proprietors, or - as in most cases - (d) under working agreements.

The rolling stock per mile, averaged .046 engines, .101 coaches and .73 goods wagons.

Fencing and level crossing gates were only provided if specially required. The telegraphs was not essential (if there were no crossing places and no night running) but it was sometimes employed as a convenient aid to working: the telephone however, was more frequently used. Point indicators and disc signals were confined to junctions, etc. In mixed trains the passengers were, as far as possible, placed in the rear, half-at any rate not in the vehicle adjacent to the engine - but a buffer vehicle was only considered necessary under certain conditions of speed, etc. Special facilities were adopted for the sale of tickets.

At junction or joint stations the service of the local line was performed by the main line; sometimes at cost price but usually gratis, the local line being only required to provide at its own cost any new installations which might be necessary. Handling expenses were paid by the line which incurred them.

(136) The gross receipts averaged £302 per mile, and the working expenses £165 per mile or 54.7% of the gross receipts. The receipts on different lines, however, varied widely, being in one case as low as £17 and in another case as high as £806 per mile; and the percentage of expenses to receipts varied between extremes of about 36 and 90.

The average interest on capital was 3.31 per cent, but the net proceeds of the local lines of Hungary were nevertheless insufficient (in 1894) to meet the interest on preference shares, and the ordinary shares usually bore no interest at all. Out of the 60 secondary railways mentioned above only eight in fact had paid dividends on their ordinary shares up to 1892. The percentage of the deficit in 1892 (without reckoning the ordinary shares, and only taking into account the sums required to meet the interest and amortisation) was 11.09 per cent. The receipts in that year worked out approximately as follows:

| | |
|-----------------|--------------------------------|
| Per passenger | 3d per kilometre |
| Per ton (Goods) | 10 $\frac{7}{8}$ per kilometre |

10 $\frac{7}{8}$

7d per kilometre

10

(137) Various remedies for this state of affairs were suggested at the time, e.g. that the narrow gauge should be more widely adopted or that the State should cease to work local lines itself but should hand over the working to lessees whose methods would be more elastic and less bound by regulation; but in 1894 these questions were still open.

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At the same time H.M. Representative at Buda-Pesth could not ascertain whether or to what extent the local railways had actually stimulated the production of agricultural and other industries in the district which they served.

(139) It is worthy of note - with regard to Hungarian railway systems generally - that although the system of private ownership prevailed for many years after the construction of the first railway (in 1846) the burdens thrown upon the State in the way of guarantees led strongly in the direction of nationalisation with the result that by 1909 (when Messrs Pearson and Reytiens reported) the system of State ownership had become paramount, even to a greater degree than in Austria.

In the acquisition of private lines in Hungary the same general principles have been followed as in Austria - see pages 194 and 195 relating to Light Railways in the latter country. In the case of "Lokalbahnen", however, the right of State purchase is always operative in Hungary at the expiration of thirty years from the date of the Concession, and if the option of purchase be exercised the payment must be made, not in a lump sum, but in yearly amounts for the remainder of the period of Concession based upon the average of the last seven or five years; and in no case must the yearly payment be less than 5 per cent of the "Anlage" Capital

(140) Apart from actual ownership the State in Hungary as in Austria is largely interested in the working of railways, privately owned lines being worked in many cases by the State either for the account of the owning Company or for State account. The working arrangements in such cases are, of course made the subject of agreement and in this connection the procedure followed in Hungary resembles that adopted in Austria but with regard to the majority of the "Lokalbahnen" worked by the State three methods of payment for working expenses are adopted. Either

(1) The line pays to the State a certain percentage of receipts, the figure varying from 48 to 54%

or

(2) The State is allowed to retain 5% of the passenger receipts and is paid a sum calculated at fixed unit rates per ton km. so far as the goods traffic is concerned;

or

(3) The line pays at fixed unit rates per passenger km. and also per ton km.

Statistics are silent as to the effect of the purchase or working of railways on the State Finances.

Appendix K

Hungary

(141) Concessions for the construction of new railways in Hungary run on practically the same lines as in Austria, but the requirements in Hungary are rather more stringent.

At the date of Messrs Pettrson & Reyntiens' Report the State had contributed 15.4 per cent of the Capital of the "Lokalbahnen" in Hungary - for the conveyance of mails and in the form of special subsidies. The Municipalities had contributed 7.7 per cent of the Capital. Fresh legislation was in contemplation, however, as the facilities for obtaining concessions had apparently been abused. The lines were constructed in many cases where there was little or no prospect of revenue with the result that large demands for State assistance had to be made.

(142) The Arrangements for the control of railways are similar to those in Austria, and a similar system of decentralised executive control obtains. For the latter purpose nine separate districts have been constituted, each of which is self-contained so far as the working control of the district is concerned. Matters of general importance must be discussed in general conference with the Ministry, and the Finance Minister is represented at every such conference.

There is also in Hungary, as in Austria, an Advisory Railway Council. This was instituted in 1907 and is concerned not only with railways but also with Shipping, Postal Services, Telegraphs and Telephones.

(143) The bases on which goods tariffs in Hungary are calculated vary somewhat, but the classification of goods is practically the same as in Austria.

"Ausnahme" (exceptional) tariffs exist for the same purposes in Austria and so also does the system of "Refaktion" (Rebates). Special "export" rates are also in force, either in the form of "Ausnahme" tariffs or "Refaktien", and it would seem that in Hungary these export rates are not difficult to obtain provided that the trade of the country is likely to be assisted thereby.

Hungary, however, has set its face definitely against the grant of special import rates, and no facilities are given to induce competition with Home Produce.

In Hungary the passenger tariff system resembles that of Austria, the zone system being largely adopted; and the arrangements with regard to luggage charges, payment of luggage porters, platform tickets, workmen's tickets season tickets, etc. were much the same in all parts of the Empire.

H O L L A N D .

(144) Apart from its main railway system Holland possesses a more or less distinct network of lighter railways designed to serve the interests of local traffic. These latter lines fall into two categories:-

- (a) Local Railways, on which the maximum speed allowed is 40 Kilometres (about 25 miles) per hour; and
- (b) Tramways; i.e. railways on which the maximum speed is limited to 20 Kilometres (about 12 miles) per hour.

There is also the further distinction that whilst the former normally make junction direct with the main lines the latter do not, even where they are of normal gauge - except in the case of the few tramways owned by the great railways. These latter are all worked by steam, are of standard gauge and make direct junction with the main lines.

This classification of the light lines of Holland, separately from the main railway system, does not imply - as in France and Belgium - that they have been paid for largely out of local funds or that their existence depends upon the support of Provincial or Communal Councils. In Holland the essential distinction between the ordinary railways and the local lines lies in the special facilities accorded to the latter and to the relief which they enjoy from the regulations as to construction and working imposed upon the former by the law of 1875, the service on the local lines being regulated by the special law of 1878 under which, by Royal Decree, deviations are allowed from the law to which ordinary railways are amenable. This relief was partial in the case of those lines upon which the speed of trains did not exceed 30 Kilometres ($18\frac{1}{2}$ miles) per hour and the axle-load was limited to 10,000 Kilogrammes (9.84 tons); it was complete in those cases where the speed did not exceed 15 Kilometres ($9\frac{1}{4}$ miles) per hour. As indicated in paragraphs (a) and (b) above, the maximum speeds were subsequently raised, in 1889, to 40 and 20 Kilometres respectively.

(145) In 1894 the length of the "Local Railways", as distinct from "Tramways" was about 160 miles - 258 Kilometres. They were all of standard (1.435 metre) gauge; but their construction was lighter than that of the main lines, the steel rails weighing not more than from 25.6 to 30 Kilogrammes per metre, i.e. from 51.6 to 60.5 lbs. per yard. The maximum axle-load allowed was 10,000 Kilogrammes, or 9.84 tons, and the lines were so solidly constructed that the 20-ton wagons of the main lines could pass over them without dividing their loads.

(146) In addition to their lighter construction the local railways present other points of difference from the main lines. Except at the stations they are single track lines. The "formation" is narrower, the gradients steeper

and the curves sharper, whilst the stations are less elaborate and the signalling arrangements simpler than on the main railways; and fencing is only required at those points where the Minister considers exceptional precautions necessary, e.g. at station yards or the like.

(147) The facilities afforded to the light lines (whether "Local Railways" or "Tramways") include their exemption from requirements usually insisted upon in connection with adjoining properties, mail services, etc. The distinction, indeed, between them and the main lines is so independent of their relations with the local authorities and so definitely marked by their emancipation from stringent obligations that even the great companies have been able to place several of their lines under the easier operation of the law of 1878 and to have them classed as "Local Railways".

The construction of the "Local Railways", which are not numerous, was conceded by Royal Decree to private companies, but their working has been leased by the latter to main line companies, such as the Dutch Railway Company, upon varying terms and conditions.

(148) Mr. W. H. Cole, writing at the close of 1898, stated that up to that date these "Local Railways" had been constructed almost universally without financial assistance from the State and always without a guarantee of interest. A similar statement appears in the Report - presented to the Foreign Office by H.M. Representative at The Hague (Mr. Bland) in 1894, who added that in one case only had the State provided a subsidy - namely, for the construction of a certain large bridge; and even this grant was made subject to special conditions.

The Provinces in some instances gave subsidies or granted loans free of interest, but only up to about 10 per cent of the construction capital. The Communes and particular persons interested also granted subsidies or - more frequently - took shares in the undertakings. The great railways also promoted construction by the grant of favourable working arrangements and by assisting extensions and improvements by way of loans exempt from payment of interest.

(149) The most important network of "Local Railways" is the system of light lines constructed by the Gelderland-Overijssel Local Railway Company, having a total length of 131.88 Kilometres - or 82 miles.

The construction of this network cost about £251,000 - or, including the advances made by the Company working it up to 31st December 1893, a sum of about £284,000. exclusive of the cost of rolling stock. The bulk of the share Capital of this Company amounting in all to £158,323. was provided by the Communes and by private individuals in the area affected, whilst the Province of Overijssel advanced about £5,600 free of interest. The Province of Gelderland granted a similar advance of 10 per cent, of the cost of constructing a particular line, up to a limit of 215,800 florins, or £17,983 sterling. Like advances were made in other cases also.

(150) As already indicated, the attitude of the main lines towards the "Local Railways" in Holland has been one of marked generosity. Apart from the readiness with which they undertook to bear the cost of extensions or enlargements, the main lines usually allow the free use of their stations and approaches to light lines which they work; and where the light railway is self-working the same user is granted in return for a small charge per train mile - subject to a minimum, whilst "joint-station" working expenses are divided in proportion to the traffic handled thereat.

The terms on which the Dutch Railway Company worked 8 contributive lines (1898) took the form either of a lease or of a partnership. In the first case the main line paid the light railway either a rent representing a certain rate of interest on the capital expenses, or the sum required to provide for interest and sinking fund on the loan, or a percentage of the receipts after deducting the working expenses, which were fixed on a mileage basis. In the second case the two companies shared the net profits in proportion to their respective shares of the capital. In both cases the working company was responsible for any deficit.

(151) Mr. W. H. Cole cites the Dutch "Local Railways" as an example of how much may be done by generous treatment and the grant of special facilities by the State and the great railway companies rather than by direct pecuniary assistance.

(152) The true light railways of Holland, however, in M. Colson's opinion, were not the "Local railways", officially so-called, but rather those lines which fell into the second of the two-main categories mentioned in the opening paragraphs of this memorandum, namely the "tramways".

These lines again fall into two classes -

- (1) Tramways laid in the streets of the Commune and serving exclusively for internal passenger traffic, and
- (2) Tramways serving to connect outlying districts and communes with the railway not or with the populous towns - or to connect separate communes or centres of population between which the traffic is very considerable.

The tramways in the first of these groups were constructed by private companies, without subventions, and resemble the ordinary urban lines, which are such a familiar feature of our English towns. Those in the second group are of greater interest to the student of light railway problems.

(153) Apart from the restriction of speed to 20 Kilometres per hour these lines, which are laid almost entirely on the roads, enjoy the widest freedom. By the law of 1880 they were made subject to the same regulations as ordinary road traffic, as laid down by the provincial authorities, with the single exception that the locomotives were subject to

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the usual rules affecting steam engines. They require, therefore no special concessions; but, whilst sharing the freedom of ordinary road traffic, they have to submit to the usual Dutch tolls - a circumstance which, according to Mr.Cole, has led to the construction of vehicles of a large size.

(154) The State, the Province, the Commune, the Land Reclamation Society or an individual - whichever may be the proprietor of a road - has absolute power to permit or to veto the use of the road for tramway purposes. The regulation of these tramways varies with different local authorities, but the treatment accorded by these authorities is usually liberal, and obstruction on the part of road-owners is of rare occurrence.

(155) A small number of these tramways was constructed by and belongs to the great railway companies, whilst a proportion is the property of the Tramway Companies of the large towns, but the majority of them were constructed by separate companies. These last usually work their own lines, although in a few cases they have been handed over to the Railway Companies or to the great Tramway Companies to work.

(156) Of steam tramways alone - according to Mr.Cole - there were about $486\frac{1}{2}$ miles (783 Kilometres) in existence in 1893, viz:-

| | | |
|------------------------------|-------------------|---------------------|
| 42 Kilometres or 26 miles of | $2'5\frac{1}{2}"$ | (0.75 metre) gauge. |
| 49 " " 49 " " | $3'3\frac{1}{2}"$ | { 1.00 " } |
| 416 " " $258\frac{1}{2}$ " " | $3'6"$ | { 1.067 " } |
| 246 " " 153 " " | $4'8\frac{1}{2}"$ | { 1.435 " } |

Of these steam tramways 57 Kilometres were worked by Railway Companies and 15 Kilometres by the town Tramway Companies at Rotterdam and The Hague. The remaining 711 Kilometres were worked by separate Steam Tramway Companies.

(157) As already indicated, the tramways of the private companies do not make direct junction with the main lines. Their construction is not such as to admit of the wagons of the railway companies being run over them, nor can the rolling stock of these tramways be attached to the trains or be run over the lines of the railway companies.

(158) The construction of the tramways in the second group was assisted by the Provinces and Communes, in many cases by annual payments spread over a number of years. In one case only, up to the end of 1894, had the State given a subvention and this was only done for special reasons; and even the Provinces granted subsidies in a few instances only. The Communes assisted more frequently, either by the grant of an annual subsidy for 10 years or by the contribution of a small sum towards the cost of construction; but in all cases the bulk of the capital (and sometimes the whole of it) was contributed by private subscribers.

(159) In Holland - as in Italy - the most prominent feature of light railway development has been the extent to which the

public roads have been utilised for the purpose, and the comparative success of these "roads" lines was attributed by M. Colson to the fact they were left untrammelled by legislation and were fairly free to settle their own rates and arrange their own train services, so that the charges were as low and the revenue as large as the application of ordinary business principles could render them.

(160) On the light "railways", as distinct from the "tramways", the issue of through passenger tickets is provided for as far as possible. Through consignment of goods - usually without transhipment - is also provided for. The contract for the hire of wagons stipulates that they shall be loaded within six hours, but no charge is made in respect of their occupation between the hours of 8 p.m. and 6 a.m.

(161) The main lines employ special tender engines, and carriages of two classes, for use on the local railways.

(162) A considerable quantity of merchandise and a large number of passengers are carried by these railways. The Gelderland-Overijssel line carries great quantities of coal, as well as raw material and manufactured goods, between Rotterdam and the factory areas in Eastern Overijssel. These lines also have a marked effect upon the development of industries in East Gelderland.

In the year 1893 the number of passengers conveyed on certain associated lines, having a total length of 201 km., was 588,484 - or, stated in another way, the number of passenger-kilometres run was 7,626,890. The fares amounted to £12,048. In addition 348,039 tons of merchandise were carried, the receipts from this source being £18,310. The total receipts from the same lines amounted to £32,004, or about 8s/8d. per kilometre per day.

On the Gelderland-Overijssel lines in the same year the total receipts were £23,845, or 9s/1d. per kilometre per day; and on another important system the receipts from passengers and goods averaged together about 5s/9d. per kilometre per day.

(163) The following brief descriptions of two particular light railways, based on notes taken on the spot by a representative of the Great North of Scotland Railway in 1896, may serve to throw further light on the construction and working of these lines.

(a) The Hoorn-Medemblick Light Railway is of normal gauge. The rails are flat-bottomed, weigh about 50 lbs. per yard and are laid on wood sleepers. The permanent way is laid on embankments a few feet high, formed by material taken from trenches (10 ft. wide and 3 ft. deep) at each side of the line.

The speeds allowed are:-

| | | |
|------------------|--------|--------|
| Passenger trains | 40 km. | } |
| Mixed | " | 30 km. |
| Goods | " | 20 km. |

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The line is laid on land which was acquired at a high cost - about £160 per acre. Fencing exists where the land-owners concerned stipulated that it should be provided; but, so far as the State is concerned, fencing is only insisted upon at danger points. There are no signals, but Morse instruments are used at all stations. There are no platforms; but brick-built station premises are provided, the accommodation at small stations including a waiting room and ticket office on the ground floor with rooms above for the Station Agent. At Medemblick the Agent is provided with a dwelling house, and there is also a goods shed there.

(b) The Zevenaar-Oldenzaal Light Railway, also of normal gauge, was laid with flat-bottomed rails weighing about 50 lbs. per yard; but in 1896 heavier rails (about 65 lbs. per yard) were being used for renewals.

The line is laid on ground which was acquired at a cost of about £50 per acre. There are no fences. Level crossings over roads are numerous and where these occur near stations protective bars are used, the bars being worked by wires from the stations; at other road crossings only posts are erected.

At the larger stations the points are interlocked with the home and distant signals. Outlying points (to sidings) are kept locked, the key being kept by the nearest Station Agent. Station buildings are provided, containing goods sheds and also dwelling houses for the Agents. Low platforms are also provided.

(164) With regard to the working of the steam "tramways", as distinct from the local railways, the following statements taken from the Report of H.M. Representative at The Hague (December 1894) may be of interest.

Tender locomotives weighing from 8½ to 13 tons are employed on the steam tramways: on a few of the lines engines weighing as much as 16 tons are used.

The traffic on these tramways varies very much in character. On the majority of them the passenger traffic is the principal source of revenue. The conveyance of merchandise is of small account, is mostly confined to the carriage of parcels and is mainly local in character. Milk, vegetables, etc., are conveyed to adjacent creameries and towns, but - except in a few cases - this traffic is of small volume and is handled in small quantities, as the larger consignments can be readily carried by the numerous navigable canals.

Cattle are seldom conveyed, as they are usually driven to the railway stations and placed in trucks. On many of the tramways, also, the traffic in timber, building materials, coal and such like bulky goods is inconsiderable.

On the other hand, on some lines having direct junction with the railways and on others situated in industrial districts or where the cultivation of beet-root is carried on, a very considerable amount of merchandise is carried.

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(Note: The bulk of the material available with regard to Italian Light Railways is contained in the Reports by H.M. Representatives Abroad (dated 1894) and in the works published by Mr. Mackay and Mr. Cole in 1896 and 1899 respectively. The official Report on "Railways in Italy" presented to the Board of Trade by Messrs. Pearson and Reyntiens in 1909 deals with the railway systems as a whole and with the main lines in particular. It contains occasional brief references to "private" and secondary" railways and to "minor" lines but it is not clear whether or to what extent the lines so described are really "light" railways. The expression "light railways" is not used anywhere in the Report.

Messrs. Pearson and Reyntiens make it clear, however, that in the period from 1905 to 1909 sweeping changes took place in the relations between the State and the Railways generally and that, at the date of their Report, an official "classification" of public railways was proceeding and that lines corresponding to the Chemins de Fer Vicinaux in Belgium would fall into the category of "secondary" railways.

In these circumstances we are at a double disadvantage inasmuch as

- (a) the information dated prior to 1905 with regard to light railways in Italy is now to a great extent out-of-date, whilst
- (b) the information since furnished by Messrs. Pearson and Reyntiens does not deal specifically with light railways or show how they were affected by the changes which took place between 1905 and 1909.

The following memorandum must therefore be read with reserve.

(165). As in Germany, so in Italy, the first railways were constructed to meet the local requirements of the different States. The first line was opened in 1839, but for the next 20 years progress was slow, the work being done either by the States direct or by private parties under concessions. The political unification of Italy between 1859 and 1871 brought about a closer association of the various lines, and considerable changes took place in 1865, when the main lines - apart from the railways of Sardinia and a few less important lines were divided amongst four large Companies. Three of these four systems, however, were absorbed by the State, during the period 1868-1880. (The fourth was taken over in 1905.)

In 1885, State management not having proved satisfactory, the working of the lines which had then been

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taken over was ceded by lease to private enterprise on a system of division based upon the gross receipts. This arrangement was made for a period of 60 years, but the State reserved the right to terminate it at the end of the first or second period of 20 years - a right which was exercised in 1905, when the State resumed the working of the lines. In the following year, as stated above, the fourth of the three large systems was taken over - so that, by 1907 the great majority of the railways in Italy were both owned and worked by the State, and the process of absorption was still proceeding.

(166). Messrs. Pearson & Reyntiens, reporting in 1909, found it impossible to give any classification of the railways into "main" and "secondary" lines. Such a classification had only just been ordered by the Law of 12th July, 1908 which provided that the category of main railways should include those which possessed special importance in respect of their mileage and volume of traffic - the number of important towns and ports served, their connections with foreign lines, etc. All other lines were to be classed as "secondary" including those which were laid on public roads or corresponded generally with the "Chemins de Fer Vicinaux" of Belgium.

(167) With regard to the earlier history of the light Railways the law of 1873 was the first to encourage the construction of lines under special conditions of economy - such as exemption from taxes on construction material and from the usual requirements with regard to continuous fencing, promotion by Provincial or Communal syndicates, and their assistance with a subsidy of 1,000 francs per Kilometre (£64 per mile) for a period of 35 years.

(168) The later Law of 1879 authorised the State to construct 1530 Kilometres (951 miles) of secondary lines on condition that district syndicates furnished 40% of the cost up to £5,150 per mile, 30% of the next £4,506 per mile and 10% of any further amount involved. Under this arrangement, for example, the Arezzo-Fossato metre-gauge line received 6/10ths of the cost of construction from the State and the remaining 4/10th as contributions from corporations. To such lines the conditions and subsidies provided for by the earlier Law of 1873 were extended, the adoption of narrow gauges was permitted and, provided that a certain width was left clear for cart traffic, the lines might be laid upon the public roads,

(169) The Law of 1881 authorised the State to assist by subsidies other lines than those covered by the enactment of 1873; and, by the Law of 1887, the maximum limit of these subsidies was raised from £64 to £193 per mile whilst the term of the concession was prolonged from 35 to 70 years. Such a subsidy was granted to the 3'1¹/₂" (0.95 metre) gauge Bielles line having a length of 24 miles - to which corporations interested also contributed a lump sum of £10,000.

(170) By the Law of 1889 the system of State subsidies

was extended to lines promoted by private parties in their own interests.

(171). Mr. Cole, writing in 1899, stated that in Italy, as in Holland, the development of "tramways" (i.e. railways laid on roads) had been much more remarkable than that of "secondary" railways. Up to that time at any rate, there was no special enactment with regard to tramways, but their position was recognised and defined to some extent by various Orders issued by the Public Works Department and the Council of State and by legal decisions. For example, a tramway could not be laid on a road without the sanction of the road authorities; it was not allowed to interfere with ordinary road traffic, i.e. the surface of the tramway had to be so laid as to admit of its being used by ordinary road vehicles. The road authorities did not surrender any part of their roads to the tramways, and if road improvements or alterations were necessary in order to accommodate the tramways they were carried out by the road authorities themselves.

(172). The only legislation which affected the tramways was that relating to the use of steam engines, but beyond the limited power thus given to the Minister of Public Works to regulate their construction and working, no special interference was held to be necessary. This limited power was only used in order to determine the maximum number of vehicles which might be included in one train and to fix the maximum speed &c., the number of vehicles being limited to 4, 5, or 6 and the speed to anything between 14 and 25 Kilometres (9-1/3 and 15½ miles) per hour. The usual maximum speed was 18 Kilometres, or about 11 miles per hour.

(173). M. Colson in 1891, recognised the use which had been made of the public roads for the purposes of rail traction, and he attributed their comparative prosperity to their decentralisation and their freedom from legislation. Private enterprise had thus had a free field, rates and service had been adapted to actual requirements, and minimum charges and maximum receipts had followed the natural laws of supply and demand. It was for this reason, perhaps, that tramways were not assisted by subsidies to any great extent. They were however classed as road undertakings and, as such, they escaped the taxes which weighed so heavily upon the railways. On the other hand they were obliged to carry the mails free of charge.

(174). According to Mr. Cole, it was anticipated by Mr. Colson (apparently between 1890 and 1900) that a law which had been in contemplation for some years would be passed by the Italian Parliament depriving tramways of all the advantages due to their decentralisation, bringing them under central control, and placing them under conditions almost as stringent as those affecting the normal railways. It was anticipated that light railways also would be dealt with by the same law and that, even where these were to be laid wholly or partly on ordinary roads, the relative concessions for construction and working would be granted by the State. It was also expected that the State would be authorised to subsidise the lines as provided by the Law of 1889 (and to require

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the districts and persons interested to furnish similar assistance) in the form of annuities running from the date of the opening of the lines for traffic.

(175). Light Railways (prior to 1899 at least) were of various gauges - 0.85, 1.00, 0.95 and 1.10 metres, or 2'9 $\frac{1}{2}$ ", 3'3 $\frac{3}{8}$ ", 3'1 $\frac{1}{2}$ " and 3'7 $\frac{1}{4}$ ", whilst on the tramways the gauges employed were 0.75, 1.100, 1.10, 0.95, 1.435 metres - or 2'5 $\frac{1}{2}$ ", 3'3 $\frac{1}{2}$ ", 3'1 $\frac{1}{4}$ ", 3'1 $\frac{1}{2}$ ", and 4'8 $\frac{1}{2}$ ".

In a list furnished to H.M. Representative in Rome by Signor Adamoli (Under Secretary of State) in 1894, fifteen Light Railways - as distinct from steam tramways - were included with a total length of 1240.4Km. Of these the Sardinian Secondary Railway system (592Km) was described as the "most important network of light railways" for which concessions had been granted. One of these 15 lines, which was a prosperous undertaking, had received no financial assistance either from the State or from a Corporation. All the rest except one to which the Province of Turin contributed, received a subsidy from the State, and most of them received assistance from interested Corporations also.

(176). Mr. Cole, quoting M. de Backer, stated that the attitude of the main lines towards the light railways was most ungenerous and the arrangements made between them in respect of through traffic were coloured by the prejudice and suspicion of the former.

(177). Of steam tramways. Signor Adamoli furnished a list of 23 lines having a total length of about 452 Km. Of these 11 were of 1.10 metre gauge and 7 were of 1 metre gauge. Only one line of 1.435 metre (4'8 $\frac{1}{2}$ ") gauge was included. The list was apparently incomplete, for according to Signor Amoretti there were about 1875 miles of steam tramways in Italy in 1895 and most of these were of standard (1.435 metre) gauge.

Mr. Cole opined that the term "tramways" had been differently applied by Signor Adamoli and Signor Amoretti and that this accounted for the apparent discrepancies of that statement.

According to the latter a highly developed and connected system of steam tramways had developed in many places especially in Lombardy. In some cases goods could be carried through by tramway, without transfer, for more than 100 miles. On the tramways round Pisa, and elsewhere, railway wagons circulated freely. About 36 Companies working 1365 miles of line, formed the Italian Tramway Association.

(178). As indicated above it is difficult to judge how far the information contained in the Report of 1909 (Messrs. Pearson & Reyntiens) refers to light railways. No special section of the report was devoted to such railways and even the occasional allusions to "private" lines, "secondary" railways and "minor lines" may or may not, be references to light railways. It may, however, be worth while to quote from the sections of the Report which deal with the subject of Concessions, State Control etc., as these may refer to light as well as to ordinary railways. The information which follows is taken from these sections.

Concessions.

All lines in Italy which are not of State construction are the result of concessions to private companies. The forms of concession are varied, but for general purposes may be classified in four groups, viz:-

- (i) Concession for construction and working of new lines.
- (ii) Concession for construction only.
- (iii) Concession for working only
- (iv) Concession for construction and working, with an added proviso giving the State power to assume the working after construction and passing of the line for traffic.

This last concession (No.iv) is probably the most general form.

The concession for construction only (No.ii) is really a consequence of the nationalisation of the lines in 1905, when it was found that the burdens devolving upon the State caused by the unification of the lines, and improvements and construction of subsidiary lines, rendered it expedient to entrust the construction of other lines which were urgently needed to private enterprise. By a Law of July 12th 1908, certain concessions for construction only were granted, but the actual form of the concession has not yet been definitely approved.

(179). Concessions for construction and working should properly be divided into two main groups:-

- (i) Concessions without subsidy
- (ii) Concessions with subsidy.

In the case of concessions without Government subsidy such concession may be granted by Royal Decree on the proposal of the Minister of Public Works. Concessions with subsidy require, in addition, the approval of the Minister of the Treasury.

The financial assistance which may be given by the State to railways varies greatly according to individual circumstances. The law of 1873 (which may be abandoned under special circumstances) authorised the granting of subsidies not exceeding 1,000 lire per kilometre per annum for a period not exceeding 35 years.

By the Law of July 24th 1877 the maximum period for which State subsidies could be granted was extended to 70 years but this period was reduced from 70 years to 50 years by the Law of July 12th 1908. As far as the amount of the subsidy is concerned, this has now been increased to a figure varying from 8,000 to 9,000 lire per kilometre.

The subsidy may be given, either in form of a lump sum or as a guaranteed kilometric subsidy per annum, the system being dictated by existing conditions. In addition to State subsidy, there is the assistance of the Provinces.

(180). As previously pointed out, concessions are granted by Royal Decree, on the proposal of the Minister of Public Works

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and also of the Treasury, if there is any question of a subsidy.

It is necessary that application for a concession should be accompanied by the following documents:-

- (i) Full technical details accompanied by plans and sections.
- (ii) A memorandum setting forth the public advantages of the proposed railway.
- (iii) A statement of the sources from which capital is to be drawn.
- (iv) In the case of lines requiring financial assistance an estimate of the gross profits and of the cost of construction and working.
- (v) An estimate of the gross receipts and expenses.
- (vi) An estimate of the pecuniary advantages which the Treasury may look forward to receive as the result of the granting of a subsidy.

Concessions for public lines are granted for a period not exceeding 70 years.

In each concession it is stipulated that should the gross profits exceed a certain figure, the State shall participate. The Law of 1865 provides that whenever the average net profit for the preceding five years exceeds 10 per cent (unless a lower rate is stipulated in the concession itself) the State has a right to half the excess. Such right, however, may only be exercised after the whole line has been open for 15 years, but this again may be varied in individual concessions.

In 1909 the stipulation as to the calculation of the gross profits had just been altered by fixing in each concession a kilometric profit, on the attainment of which the State appropriated an average of 30 per cent of the gross kilometric profit.

(181). Concessions generally contain a clause reserving option of purchase to the State.

A. Purchase based on Profit.

The Law of 1865 stipulates that the Government shall have the right of purchase at any time after the expiry of 30 years from the date of the opening of the line for traffic, on giving one year's notice.

As payment for the whole of the unexpired period of the concession the Concessionaire receives an annuity equal to one-third of the net profits of the five best out of the last seven years immediately preceding the giving of notice to purchase. In addition, the Concessionaire receives payment for stores and material, rolling stock, etc., at a price to be decided by agreement or determined by arbitration. The annuity may, at the option of the Concessionaire, be capitalised at 5 per cent.

(In some cases it should be noted that rolling stock has been provided by the State, and therefore there is no payment made under this head).

Deviations from the method of purchase referred to above

have occurred in respect of the period at which purchase can be effected by the State. Some lines have been purchased within 20 years of construction, others within 15 years, while the option of purchase in some cases has been exercised within five years from the date of the opening of the line.

B. Purchase within Two Years of the Completion of the Line.

Article 12 of the Law of December 4th, 1902, provides that a clause shall be inserted in each concession giving the State the option of purchase within two years after the construction of the line. Suitable notice must be given to the Concessionsaire and the purchase price must be based on the cost of construction and expenditure on materials, rolling stock, etc., with a premium of 5 per cent.

State Control.

(182). The present system of management of State-owned railways in Italy was inaugurated by law of April 22nd, 1905; and the railways actually passed into the management of the State on July 1st, 1905.

Theoretically the idea of the State has been an autonomous administration with State supervision; the actual management is in the hands of a general manager attached to the Ministry of Public Works. The law provides that this Department shall have.

"The direct management, including finance, of all matters concerning the working of the railways, "The Minister of Public Works and the Minister of "the Treasury so far as the latter is concerned are "to satisfy themselves by means of inspections that "the administration and working is performed in a "satisfactory manner".

In addition, however, to the control exercised by the general manager there is also the controlling body known as the "Council of Administration" established by Royal Decree of September 12th 1907.

The Council of Administration consists of the general manager as president and eight members, two chosen from the ranks of the chief State Railway officials, three from the ranks of the higher State officials, and three from the general public possessing technical and administrative qualifications.

The general manager is required to submit an annual statement, after the same has been approved by the Council of Administration, to the Minister of Public Works setting forth detailed information concerning the working of the railways and any recommendations as to conditions of transport and tariffs.

In addition to this direct management, there is further a Parliamentary Supervisory Committee, appointed by law of July 7th 1907.

This commission consists of six senators and six members of the chamber of deputies. They are elected by their respective chambers for a period of three years.

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Financial control is exercised by the Treasury, of course in conjunction with the Minister of Public Works, The Budget requires to be approved by the Minister of the Treasury and actual expenditure is supervised by the "Corte dei Conti" (Court of Accounts".

Stores are controlled by the General Manager.

Control over Private Railways.

(183.) Control over private railways is exercised by a special railway office, instituted by law of June 25th, 1905 which in point of fact is a special railway department directly attached to the Ministry of Public Works. There are in addition to the departments actually in the Ministry nine District Inspectorates, each having the supervision of a separate section of line.

The supervision extends to all questions of working staff, and finance. The rates of pay of the staff, time tables for goods and passenger trains, etc., and agreements between private companies must be approved by the State and the staff must undergo technical examination at the hands of the State.

All rates and fares for passengers and goods are fixed in the concessions, and any modifications must be approved by the Government. All regulations in respect of the payment, punishment, and pensions of the staff must be submitted to and receive the approval of the Minister of Public Works before being brought into operation.

In Italy, there is a use of what may be termed purely private railways, i.e., railways not originally required for ordinary traffic, and which have been more in the nature of connections between works, etc. These lines are divided into two classes, the first class comprising lines laid exclusively on land belonging to persons by whom they were constructed, without interfering with any public or private property. The second class consists of lines crossing property belonging to other persons and public roads.

The control of the Minister of Public Works is restricted in the case of railways of the first category to questions of public safety, but in regard to railways of the second category the detailed plans must be approved by the Ministry, and the lines themselves must also, as regards working, conform to the regulations applying to secondary lines.

By law of July, 1879, a new kind of private railway of the second category was brought into being, namely "private railways of the second category authorised for public traffic".

It was found in some cases that the volume of local passenger and goods traffic was not sufficient to make the construction of a public railway possible from a financial point of view, and this law of 1879 contained the following:-

"The Government is empowered to authorise public traffic on private lines, as a temporary measure, and for a period not exceeding 20 years, on condition that the stipulated rules and regulations are observed."

Experience having shewn that in some cases these private lines, adapted to the public service, met a real local requirement which, without assistance from the State; could not have been provided for by means of a public railway, the law of July 12th, 1908, contained a clause as follows:-

"The Government is empowered to grant annual kilometric subsidies up to an amount of 1,200 lire per kilometre and for a period not exceeding 20 years to private railways authorised to carry public traffic.

Advisory Councils.

(184). In addition to the Council of Administration for the assistance of the General Manager, General and District Advisory Councils have recently been instituted by law of July, 7th 1907.

The General Advisory Council is presided over by the Minister of Public Works and includes in its membership the General Manager of the State Railways, chief officers of the Ministry of Public Works, the Treasury and other Government Departments, together with chief officers of the main and local railways and representatives of trade and industry.

This General Council considers reports received from the District Advisory Councils, studies the requirements of agriculture, industry and commerce in relation to tariffs, traffic and time tables and makes recommendations thereon. It must be consulted by the Central Railway Administration with regard to tariffs, the regulations and conditions under which special concessions are granted and the expediency of deferring or renewing such concessions. It is also concerned with the description and classification of goods; and the Ministry of Public Works and the State Railway Administration also submit to the Council questions concerning the relations existing between the public and the railways with regard to traffic, etc.

The District Advisory Councils are composed of the district railway manager as President together with two other district railway officials and local representatives of industry commerce and agriculture. The Minister of Public Works also nominates two other members, selected from persons conversant with railway matters,

The function of these District Advisory Councils is to report to the General Council their opinion with regard to tariffs, local time-tables and the requirements of the traffic in their particular areas.

(185) The following particulars respecting the Palermo-Corleone Railway in Sicily have been taken from Mr. Cole's book:-

| | |
|--|---|
| Length | 42 miles. |
| Gauge. | 3 ft. 1 $\frac{1}{2}$ ins. |
| Width at formation level, | 11 ft. 6 ins. |
| Steel flange rails, | 40 lbs. per yard, laid on metal bed-plates. |
| Minimum depth of ballast under sleepers, | 4 ins. |
| Running time, including stops, | 9 $\frac{1}{3}$ miles per hour. |
| ditto | excluding stops, 11 miles per hour |

APPENDIX K.

Italy.

The passenger coaches (which were of two classes, each having 16 seats) and the luggage vans weighed 3 tons empty and 7 tons full. The four-wheeled wagons weighed 3 tons empty and 9 tons when loaded to full capacity, or 6 tons when loaded with general goods. For bogie-wagons the corresponding weights were 6, 18 and 9 tons respectively. Thus, two four-wheeled wagons having a total dead weight of six tons would carry 12 tons of general goods, whilst one bogie-wagon with the same dead weight would carry only 9 tons. (This difference of capacity was in favour of the four-wheeled wagon: on the other hand the tractive power required to haul three 4-wheeled wagons on curves would haul two bogie-wagons).

The engine-loads, with three axles coupled, varied from 45 or 50 tons on a maximum gradient of 3.9 per cent. to 100 or 105 tons on the level. Tank-engines were used weighing 24 tons 6 cwt., the maximum axle load being 6 tons 4 cwt.

As indicated above the maximum gradient was one in 25.6; the maximum radius of curves was 230 ft.

For the first four miles from Palermo the line ran alongside and level with the highway, from which it was separated by a low stone wall, but this was designed to serve rather as a boundary and to hold the ballast than to protect the road traffic. In this connection it was stated that, although there was considerable traffic on the highway, no difficulty was experienced in working this section of the line.

(186) With regard to Steam tramways" as distinguished from light railways, such as that which has just been described, it is stipulated that the upper surface of the rail shall be laid flush with the surface of the road, but in many cases the metalling between the rails is decidedly rough so that, although ordinary carts are not prevented from passing over the tramway, there is no inducement for them to remain thereon.

When the road is 32 ft. 10 in. or more in width the line is marked off from the highway by spur-stones at intervals so as to leave a carriage-way of 19 ft. 8 ins. clear. On roads of minimum width (26 ft. 3 ins.) the line is not marked off in this way and the clear space left for carts, etc. is only 16 ft. 5 ins. On the narrower roads in the neighbourhood of Milan the tramways are sometimes laid in the centre of the highway and share it with ordinary cart traffic. On bridges the minimum distance between the parapets is 23 ft. 1½ ins, which also gives a clear space of 16 ft. 5 ins. In streets the line is usually laid in the centre of the road-way but at narrow places it must be laid at one side so as to leave a minimum clearance of 15 ft. 9 ins. on the other side.

(187) On the steam tramways (at the date of Mr. Cole's book) flat-footed rails were exclusively used, being spiked directly to the sleepers in the straight sections but laid in chairs or on bearing plates in the curved sections. The rails weighed from 36 to 42 lbs. and were laid on oak sleepers measuring 7 ft. 3 ins x 7 ins. x 4½ ins. Guard-rails were used on curves of less than 165 ft. radius.

The cost of the permanent way with a 40 lb. rail (in 1885) was said to be about 15/- per lineal yard.

oak sleepers . The line is of normal gauge and, including stations, cost between £1,500 and £1,500 per mile. The total length of the line is 100 km. laid almost entirely on the public roads.

The locomotives weigh 10 and 14 tons. The actual running speed reaches 15 miles per hour; the maximum speed allowed being 18 miles per hour. The steepest gradient is one in 30, for a length of 200 yards.

Station buildings are provided at the termini only. Tickets are issued on the trains. The coal consumption works out at about $2\frac{1}{2}$. kilogrammes ($5\frac{1}{2}$ lbs) per kilometre.

The drivers are allowed $5\frac{1}{2}$ kilogrammes per Km. and if more than this is consumed the driver pays 40 per cent and the stoker 20 per cent of the cost of the excess amount consumed. If less than the allowance is consumed the driver receives 40 per cent and the stoker 20 per cent of the value saved.

(b) The Bergamo-Albino line is constructed of 45 lb. rails laid on iron bed-plates and secured by dog spikes to oak sleepers. Station buildings are provided but no platforms. The level crossings are protected by bars operated by wires. Where sidings are laid to factories, etc., the land for the siding is acquired by the trader concerned; but where the distance is very short the railway company constructs the sidings up to the entrance to the works. The trader pays rates calculated as from the nearest station.

(190). With regard to the financial results obtained from the working of light railways and tramways in Italy, no very conclusive figures seem to be available; but in the absence of any clear evidence to the contrary it would seem that the railways and tramways in question have at any rate benefited the localities through which they run, and probably also the Concessionaires.

Appendix K.
India.

1.

I N D I A.

(191) In India (including Burma), according to the Government statistics for 1918-19, there were then in existence approximately 18,000 route miles of 5'6" gauge, 15,000 route miles of metre gauge and about 3,000 miles of 2'6" gauge Railways. Whilst, in Europe, the metre gauge has been largely adopted for the purpose of Light Railways, metre gauge lines in India, or the greater proportion thereof, cannot be regarded as Light Railways; they are heavily built main lines, and as such their construction and operation is not perhaps of interest or value to the Light Railways (Investigation) Committee.

(192). The place of Light Railways in India has to a large extent been taken by the so called "feeder lines" of 2'6" gauge, the development of which has mostly taken place in the course of the last 20 years. These (2'6" gauge) feeder lines are usually constructed in a substantial manner and the rolling stock in use is surprisingly large. Some particulars of the rolling stock on the 2'6" gauge Feeder lines of the Bengal Nagpur Railway are given in the Statement annexed and may be of interest. Much of the stock is fitted with continuous (vacuum) brakes. The permanent way is usually of 41 lbs. per yard flat bottomed rails laid on wooden sleepers and ballasted with broken stone throughout.

(193). These feeder lines are not usually constructed along existing roads; they are unfenced and there are no station platforms. They are equipped with electric telegraphs and the simplest form of block signalling, with small station buildings at crossing places, according to requirements. The average cost per mile on a pre-war basis, including all equipment, was about Rs. 15,000, equal to £1,000, at the exchange rate of Rs. 15 = £1.

(194). There are also some hundreds of miles of 2'0" gauge Railways in India, but they have as a general rule been recognised as less efficient than the 2'6" gauge lines, and it is probable that this latter gauge will remain the standard for feeder lines in India.

(195). The net results of working for the 2'6" gauge and 2'0" gauge railways in India for the years 1917-18 and 1918-19 respectively are as stated below:-

Railways mainly of 2'6" gauge - but including some of 2'0" gauge.

| Years | Mileage of Line open on 31st March | Total Capital Outlay | Gross Earnings | Working Expenses | Net Earnings | Percent- age of Net earn- ings on Capital Outlay. |
|---------|--|--------------------------------|------------------------------|------------------------------|---------------------------|--|
| | | Rs. | Rs. | Rs. | Rs. | |
| 1917-18 | 3468 | 18,40,30,000 (\$18,403,000) | 1,60,24,000 (\$1,602,400) | 1,02,22,000 (\$1,622,200) | 58,02,000 (\$2580,200) | 3.15 |
| 1918-19 | 3543 | 19,29,07,000 (\$19,290,700) | 1,64,24,000 (\$1,642,400) | 1,20,61,000 (\$1,206,100) | 63,63,000 (\$2636,300) | 3.30 |

The amounts quoted in the foregoing table are expressed in Rupees and the equivalent shown in Pounds sterling have been calculated at the rate of 10 Rupees to the £, i.e., at about the rate of exchange now current. Thus 18,40,30,000 Rs., or 18 Crores, 40 Lakhs, 30,000 Rupees = £18,403,000.

(196) It will be observed that, as in European Countries, the net return on the Capital expended is small and not sufficient in itself to encourage the private investor. The Government of India, however, clearly recognise the value of such feeder lines in the development of the Country and also the value of the additional earnings which the main lines derive from their construction. They accordingly grant certain concessions with a view to attracting Capital, and the terms and conditions upon which these concessions are granted may be stated briefly as follows:-

- (1) Capital to be raised in Rupees and the Government to be satisfied as to the sufficiency thereof.
- (2) Railway to be built in accordance with plans and estimates approved by the Government.
- (3) All land in British Territory, including land temporarily required for ballast quarries, brickfields, etc., provided free.
- (4) Under certain conditions the Government will make surveys of projected lines.
- (5) The Government provide telegraphs on terms in force on State Railways.
- (6) Special low rates are granted for the carriage of railway construction materials over State Railways.
- (7) The Government grant financial assistance either by (a) a guarantee of interest or by (b) a rebate to the branch line from the net earnings of the main line derived from traffic interchanged with the branch.

- (a) Guarantee of Interest is at the rate of $3\frac{1}{2}$ per cent. If the branch earns more than 5 per cent, the surplus profits to be equally divided between the Government and the Proprietors.
- (b) Rebate terms are such as to make up, from the net earnings of the main line derived from traffic interchanged with the branch, a sum sufficient to pay 5 per cent. on the Capital. Earnings of the branch (unassisted) in excess of 5 per cent. to be equally divided between the Government and the Proprietors.

Either or both (a) and (b) may be applicable in any case

- (8) The Government are also prepared to undertake the working of Branch lines on special terms according to local circumstances.

(197). It may be pointed out that feeder line Railways in India have a greater importance and serve a more useful purpose than Light Railways in Europe because the greater part of the country is inefficiently and insufficiently served by roads. Such roads as there are - other than the main trunk roads - are unmetalled, and fair weather tracks only, are quite unsuited for motor traffic, and usually impassable for wheeled vehicles during the rainy season from the middle of June to the end of October.

(198). It must not be concluded that Light Railways or feeder lines in India are confined to the 2' 6" gauge. There are also Light Railways of the standard or 5' 6" gauge and of the metre gauge, making physical junctions with the main line Railways, thus avoiding transhipment at junctions, but the usually accepted view in India is that for the development of the country, where the traffic to be expected is small, the greater cheapness of the 2' 6" gauge more than balances the expense and inconvenience of transhipment if the length of the branch or feeder line exceeds, say, 20 or 25 miles.

STATEMENT (SEE PARA.192).

INDIAN LIGHT RAILWAYS.

LOCOMOTIVES - 2' 6" GAUGE.

4.6.2. type tender locomotives.
Length overall 49' 6"
Weight in working orders:-

| | T. | Cwt. |
|--------|----|------|
| Engine | 33 | 5 |
| Tender | 18 | 7 |
| Total | 51 | 12 |

Coupled wheels, 3' 6" diameter.
Cylinders, 14 $\frac{1}{2}$ " x 18" stroke.
Maximum axle load, 7 tons.
Grate area, 17.5 square feet.
Tender carries 1,700 gallons of water.
Tractive force at 90% of boiler pressure =
13,000 lbs.

2.8.2. type tender locomotives.

Length overall, 49' 0".

Weight in working order:-

| | T. | Owt. |
|--------|----|------|
| Engine | 40 | 10 |
| Tender | 18 | 15 |
| Total | 59 | 5 |

Coupled wheels, 2' 10" diameter.
Cylinders, 16" x 18" stroke.
Maximum axle load, 7 tons 2 $\frac{1}{2}$ cwt.
Grate area, 20.5 square feet,
Tender carries 1,700 gallons of water.
Tractive force at 90% of boiler pressure =
19,500 lbs.

Maximum height of both the above 10' 0"
" width " " " " 7' 6"

PASSENGER AND GOODS STOCK - 2' 6" GAUGE.

3rd Class Passenger Coach:-

Under frames 29' 6"
Maximum width 7' 6"
Tare, 10.9 tons
Capacity, 42 passengers.

3rd Class Passenger Coach:-

Under frames 35' 0"
Maximum width 7' 6"
Tare, about 12 tons.
Capacity, 50 passengers.

Horse boxes to carry four horses, with compartment
at each end for horse attendants.

Covered goods wagons:-

Under frames 29' 6"
Tare, 7 tons, 15 cwt.
Paying load, 16 tons 5 cwt.
Capacity 1,200 cu.ft.

Appendix K.
India.

STATEMENT (CONTINUED).

PASSENGER AND GOODS STOCK - 2'6" GAUGE. (Contd.)

Mineral hopper wagons: -

Under frames, 29'6"
Tare, 8 tons 7 cwt.
Paying Load, 15 tons 7 cwt.
Capacity, 660 cu.ft.

Covered goods wagons on 35 lb. under frames have a capacity of about 1,500 cu.ft. and a paying load of 16 tons 16 cwt. Tare, 8 tons, 4 cwt.

All the above stock is fitted with vacuum brakes.

